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ORIGINAL ARTICLES.

SOME CONSIDERATIONS ON INFECTION AND IMMUNITY.¹

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THERE are certain epochs in the study of vexed questions, when a knowledge of their *status praesens* is desirable. We have now reached such a period, with reference to the somewhat obscure topics of infection and immunity. It is the purpose of this paper to supply this information, so far as a brief statement of facts, stripped of unnecessary technicalities, makes it possible.

When Pollender,² about the middle of the last century discovered the bacillus of anthrax, the first notable impulse was given to the study of infection. A little later Davaine produced the artificial disease in animals by injecting blood containing these bacilli. Pasteur in his turn cultivated the bacilli in nutrient fluids and produced "pure cultures." Later, Koch separated different kinds of bacteria by "plate cultures," and "cultures in solid media." Novel methods of staining and the use of special objectives further aided in differentiating one species from another. This brief outline of facts introduces us to the present bacteriological aspect of infection.

So far as immunity is concerned, after it had been secured from smallpox by vaccination, the next step was made by Pasteur, working on the assumption that a mild form of the disease might produce exemption. He "attenuated" the virus in several ways, and his methods for inoculating cattle and sheep against anthrax have been widely used and highly approved. The discovery of the antitoxins, however, we owe to Salmon and Smith of this country. But the method of preparing them is generally attributed to Behring. These discoveries have been of inestimable value in the saving of life. For experimentation has shown that infection is caused by microscopic vegetable or animal life, or their products.

In diphtheria and tetanus the infecting agents are referable to microorganisms of a vegetable character. Malaria, amebic dysentery, the "Texas disease" and "surra" in horses and mules however, are due to protozoa, in other words to microscopic animals; while there is always a possibility that yellow fever, scarlet fever and smallpox may be found to be caused by allied animal organisms, though as yet satisfactory proof is lacking. But so far as we now know, bacteria are the chief causes of disease, and the infecting bodies in tuberculosis, typhoid, glanders, gonorrhea, anthrax, tetanus, bubonic plague, suppura-

tion, erysipelas, lobar pneumonia, influenza, diphtheria, ordinary dysentery, cholera and relapsing fever are believed to have been discovered, although they cannot all stand the test of Koch's well-known law, which is

1. That the microorganisms must be found invariably in a given disease and in no other, their numbers and distribution conforming to the lesions of the disease.

2. That the organisms obtained from lesions of the disease must be capable of reproduction in pure cultures.

3. That these cultivated germs must be capable of producing the disease if inoculated on a susceptible animal.

4. That these artificial lesions contain the specific organisms.

Of the list thus given cultures of the bacteria of bubonic plague and glanders have on several occasions communicated these diseases to laboratory workers, and sometimes have caused death. In others such as leprosy, there is doubt whether the bacillus has been successfully cultivated, certainly, inoculation experiments have yielded uncertain results; while erysipelas appears to have no specific bacterium, and to be due rather to the *Streptococcus pyogenes*, one of the pus-producing bacteria.

There is no doubt that the requirements of Koch's law are severe. It is one thing to see a successful development of the inoculated culture within the body of an animal, and another to reproduce the disease with its clinical signs. This latter requirement has been the great stumbling block for laboratory workers.

There is also a strong presumption that the infecting agent is bacterial in syphilis, mumps, measles, whooping cough, typhus, hydrophobia, dengue, acute inflammatory rheumatism and beriberi, but the proof is still lacking just as in yellow fever, scarlet fever and smallpox.

Possibly some of these organisms are so minute, that they cannot be differentiated by our present microscopes. Nor has the last word been said as to the morphology of the bacteria with which we have to do.

But there is another class of microcytes that are concerned in causing disease. These we call fungi. They are usually classed among the mold or yeast fungi. Of these a conspicuous example is actinomycosis, which causes the "big head" of cattle, and occasionally occurs in the human subject. Another is the *Leptothrix buccalis*, which causes the gangrenous inflammation of the mouth called "noma."

The *Aspergillus niger* may also produce a disease of the external ear, or complicate a bronchial pneumonia, in which latter case it will be a secondary infection. These microcytes, which

¹ Introductory to a Symposium on "The Combat with Infection," American Therapeutic Society, June 4, 1904.

² As early as 1849.

like the *Aspergillus* live on dead matter, are called saprophytes, and they are classed as facultative, if they have the inherent power of infection independent of contamination from sources outside of the body.

Evidently then, according to our present information there are three sources of infection. The most common appear to be bacteria, less often fungi; and least of all, protozoa, though the latter are certainly assuming a greater numerical importance.

Allusion has been made to the fact that bacteria may not cause infection directly. This discovery was due to the study of the bacterial poisons called *ptomaines*, which could be easily isolated. For a ptomaine may be regarded as an organic chemical compound, toxic in character, formed by the action of bacteria on nitrogenous matter.

Now the poisonous effects produced by the inoculation of some of these ptomaines on animals led to the supposition that analogous substances formed by the specific bacteria of infective diseases might account for their characteristic symptoms. But research has not determined the intimate nature of these bacterial products. We know they are poisonous and call them *toxins*, but their composition is unknown; in fact it has been found impossible to isolate them so completely as to establish their chemical characters. And yet they have been obtained from the bacteria, not only of diphtheria and tetanus, but of other diseases.

There is also some evidence to indicate that other specific bacteria elaborate poisonous products. In fact bacteria as a rule generate special poisons, though in typhoid fever and in cholera certainly, the poisons remain for the most part inside the bacterial bodies.

From our present standpoint, the question of incubation offers few difficulties. At the beginning of an infective disease, the infecting bacteria are comparatively few in number, and their toxins small in quantity. But both develop proportionately, the elevation of temperature and constitutional symptoms keeping pace with their development. When enough poison has been generated, the disease manifests itself by characteristic signs. The time required for this purpose will depend on the quantity or virulence of the initial dose, and the resistance offered in the body.

These circumstances may account for the variability of the duration of incubation. That it is even tolerably uniform in the various infections is quite remarkable.

The term *contagion*, in the narrow sense, suggests that it should be limited to diseases communicated by direct animal contact. But even in the most virulent of them, such as gonorrhea, the contact may be mediate, rather than immediate, contaminated objects, such as soiled linen, serving as vehicles for spreading the disease. In yellow fever, also, the *Culex fasciata* appears to carry the poison, while the tsetse fly of the East, infected with the *Trypanosoma* inoculates horses and other animals,

and even man occasionally, producing the fatal "surra." Rats, and probably flies, ants and fleas are also the intermediate hosts of the plague germ. Evidently then, in these most characteristic contagious diseases, there is infection, and therefore they are infective. On the other hand, infective diseases may not be contagious. Epidemic cerebrospinal meningitis is an example. It is infective, but not contagious in the ordinary sense, that is, it does not appear to be carried from person to person.

Infection accordingly may be mediate or intermediate, direct or indirect. Anthrax, typhoid, cholera and diphtheria can be propagated in either way. For typhoid and cholera can be transmitted through the media of water, in which they can live, if only there is a very little albumin; or directly from the excreta. Diphtheria can be communicated through the medium of milk, or by contact with an infected person. The possibility must be borne in mind, however, that these and the bacilli of typhoid may have a mycelial growth like the fungi; even that sometimes they may be facultative saprophytes, i.e., that they can develop *de novo* in suitable dead material. On this point however, it is true, the evidence is unsatisfactory. In some affections, like tetanus and diphtheria the pathogenic bacteria have only a local manifestation; in others like anthrax, they may infect the blood throughout the system.

Obviously, from a therapeutic point of view there is a vast difference between the two. But these conditions are not constant. For example, in the experimental anthrax of guinea-pigs the disease is apt to be systemic, while in mankind it is apt to be local. A mouse inoculated with anthrax in the end of his tail, may die in less than a day, while an individual whose hands have been poisoned by handling anthrax hides, may have only a comparatively mild local affection.

In fact, the behavior of any animal toward an infection varies according to the species, the individual, or circumstances. The frog is refractory to anthrax under normal conditions. The resistance of the guinea-pig to the diphtheritic poison may be acquired by successful inoculations; so that finally a dose that would be fatal under ordinary circumstances may cause no reaction at all. In the discussion of this subject also, it should be borne in mind that there is apt to be a wide difference between the human disease and the experimental of animals, both as to symptoms and lesions. If a rabbit is inoculated with a bit of diphtheritic membrane, it will usually sicken or often die, but no membrane will appear on any mucous surface. In seventy inoculations¹ practised on rabbits, by Dr. Edward Curtis and myself, with known diphtheritic poison, in the aqueous infusions of pure membranes (plain, boiled and unfiltered), porous clay filtrates, putrid infusions (plain and boiled), and others intermixed with salicylic acid, in no in-

¹ "Pathology of Diphtheria." N. Y. Bull. of the Board of Health, Feb., 1877.

stance was there any diphtheritic membrane found on a mucous membrane of these animals, though autopsies were made on twenty-five of them, usually with great care. Nor did paralysis occur in any one of them.

It is said, however, that if the vaginal mucous membrane of young guinea-pigs is inoculated with diphtheria bacilli, a pseudomembrane will appear there; and yet it is to be remembered that a pseudomembrane apparently similar sometimes occurs independently of diphtheria, when mucous membranes are inflamed. In tetanus, however, there is a marked resemblance between the human disease and the artificial of animals, even to the character of the spasms. On the other hand, in diseases such as anthrax, glanders, and foot and mouth disease, which occur both in men and animals, there is sometimes an extraordinary similarity in the symptoms; but they are never alike.

It can certainly be said of the lesions of tuberculosis that they are unlike in men and animals. As long ago as 1882¹ I called attention to this point, for in investigating the pathological lesions of pleuropneumonia in cattle, I had the opportunity of seeing many instances of bovine tuberculosis, with which pleuropneumonia was sometimes confounded, and I epitomized the differences at that time, stating that in man the tubercle tends to become caseous: in cattle cretaceous. Besides, the ulcers and cavities of advanced human phthisis occur rarely, if at all, in cattle. The little centers of disease grow by the deposit of cretaceous matter in concentric layers until the pulmonary lobule is distended to many times its normal size, eventually forming a yellow tumor of stony hardness. The interlobular tissue also is filled with little tumors, usually pedunculated, that vary much in size. The visceral and parietal layers of the pleuræ are also covered with similar tumors, which form grape-like clusters, known as "grapes" or "angleberries." In 1896 Theobald Smith² noted also a difference in the two bacilli. That the pathological lesions of bovine tuberculosis are quite unlike those of the human variety is therefore apparent. These are but examples of the differences between the diseases of mankind and the lower animals, called by the same name.

In pursuing this matter further we find that susceptibility is a relative, instead of an absolute term. It may mean merely that a small rather than a large dose is necessary to produce infection. Susceptibility may be inherent in an individual, in races, or in genera. We all know that some persons will not contract malarial poisoning and that colored people are refractory to yellow fever. But pigs are not susceptible to tuberculosis, while the guinea-pig is easily infected. In the same way immunity is a relative rather than an abstract term.

Three varieties of susceptibility are recognized, a natural, acquired and an inherited. The

natural susceptibility of some animals is very great. For instance, mice and guinea-pigs are peculiarly susceptible to anthrax poison. We also know from experiments that certain persons will contract almost any infective disease to which they are exposed, while others under similar conditions will escape. This disposition may be inherited in a given case, though it may not be natural for the species. Some of the protective influences we know. Age is one. During the first years of life there is little disposition to infection, but from that period on until puberty the tendency increases gradually. As old age approaches, there is a somewhat progressively decreasing disposition to infection. Similar conditions are observed in the lower animals. In animals deprived of food or drink the susceptibility is increased. Improper or unaccustomed food, sudden changes of temperature, shock, spasms, fatigue, exhaustion, worry, are closely related to the causal production of infection. The final disease, or, as it is now called, the *terminal* affection, so commonly the cause of death in chronic non-infective diseases, is apt from these causes to be infective, and for this reason. Assuming in a given case tuberculosis to be the terminal affection, it may have remained latent for an indefinite term, until the shock of an operation, exhaustion following parturition, or some wasting or chronic disease has broken down the individual's susceptibility, when the tuberculosis takes on an acute form and carries him off.

I have now to speak of acquired and inherited immunity. There are two forms of acquired immunity, the active and the passive; and they are of great interest to us of the present time. Active immunity is best described by what it accomplishes. For example, the attack of an infective disease produces active immunity for a variable period. So do small doses of virulent cultures; large doses of cultures attenuated in various ways; injections of bacterial products as employed by Haffkine for prophylactics against plague; and injections of the sterilized products of the bacillus. This latter method has been employed with some success in tetanus and diphtheria.

At first small doses of the toxin are used, and the amount is gradually increased until immunity is accomplished. An animal may be so immunized that it will not react to a dose 100 times the amount necessary to kill the animal before inoculation began.

This method is used in conjunction with the inoculation of living and virulent cultures in the preparation of the antidiphtheritic sera taken from horses.

Passive immunity is produced by antitoxins. Salmon and Smith of Washington were the pioneers in this movement,³ as I have already said. Experimenting on pigeons with the filtrates from cultures containing the products of the hog cholera bacillus, they found that

¹ "Considerations on the Origin and Natural History of Tuberculosis," Medical Record, October, 26, 1882.
² Journal of Experimental Medicine, Vol. III, p. 451.

³ Smith, Procedures of the Biol. Soc. of Washington, Vol. III, p. 29, 1884-1886.

pigeons were made immune to the bacillus which produced the disease in ordinary pigeons. Behring followed by devising a plan for preparing the antitoxin. The bacilli are first cultivated in bouillon, and then the cultures are freed from bacilli by filtration. The filtrate containing the toxin is then injected into horses, in successively increasing doses. After large quantities of the serum have been injected, the horse, becomes immunized. In the serum of his blood is the antitoxin. Of course some modifications of this method are in use, but in the main it is carried out in the manner stated.

In passive immunity the individual inoculated with the antitoxin shares the immunity *passively* with the animal from whom the antitoxin is drawn. It is the condition produced by serum therapy. The antitoxin is both prophylactic and curative, but the dose required for a cure is much larger than for prevention. Passive immunity can be produced quickly; active immunity requires time, but has a more enduring quality than the passive form.

Inherited susceptibility is perfectly comprehensible, just as any other quality transmitted from a parent. Inherited immunity has been shown experimentally in anthrax and tetanus. On the supposition that the mother has been actively or passively immunized, the offspring may partake of her immunity; or enjoy a natural immunity handed down by either parent.

We are at all times beset by infective bacteria. They are in the air we breathe, the water we drink and the food we eat, but if the amount is *subminimal*, that is, below the toxic dose, we are not poisoned. If the dose is maximal, infection may easily take place. An instance of this kind recently came under my observation. A father and mother with four children living in a tenement house, in four small rooms, with only two windows, were all prostrated at one time by epidemic influenza, while other families in the tenement were not affected. The poison in this case was present in maximal quantities. The site of the inoculation is also a controlling factor. Some parts are less resistant than others. A part of the body that is in a normal condition may be successfully inoculated, while a similar part in a state of inflammation may be refractory. We have already seen that the virulence of a pathogenic organism may be raised or lowered by artificial means. We may produce a pure culture or attenuate it.

Specific infection, however, is apparently diminished or intensified by microorganisms other than the pathogenetic ones.

Thus tetanus is possibly dependent to some extent on the microorganisms associated with the specific. On the other hand, if the bacillus of anthrax is inoculated together with the bacillus of erysipelas, the attacks of anthrax will be mild as compared with an attack where the anthrax bacillus alone had been inoculated. So in diphtheria, the association of staphylococci or streptococci with the bacilli of diphtheria is apt to

modify the course of the disease. These are examples of what is known as *mixed infection*. To render an animal immune there is another method besides that of neutralizing the toxin by antitoxin. It is by the use of *bactericides*. When microorganisms alone are used for producing immunity, the serum develops marked antibacterial powers, while it has little or no effect on the toxins elaborated. On the other hand when the filtered cultures (toxins) are used, the serum develops both antitoxic and bacteriolytic properties.¹ It is apparent therefore that the sera prepared by these two methods are not identical. These principles are recognized in the manufacture of the various specific sera, such as the antidiphtheritic serum, antiplague serum, etc., and both bacteria and their toxins are, as a matter of routine, injected into the donating animal, though in antivenin (snake poison), bacteria are obviously not necessary. And so most sera used in the treatment of disease have both antitoxic and antibacterial powers. This is important, for as a *curative* remedy, an attack is made not only on the bacteria that make the toxins, but on the toxins which produce the disease. But from a prophylactic point of view, it is sufficient that a serum has *bactericidal* properties.

A curative serum, therefore, is necessarily a protective. As there is a great variation in the amount of serum required in a given case, it has been necessary to standardize the serum to make it effective. The method of Ehrlich is now generally used. This is his method—First of all the least amount of diphtheritic toxin which is requisite to kill a guinea-pig (weighing say 250 to 300 grams) in 3 to 5 days is determined. Then an estimate is made of the exact amount of antidiphtheritic serum that is required to neutralize 100 of the above toxins. This constitutes the *unit*. Now, this unit may vary in size, but the more potent the serum the less the quantity required in an injection. Therefore to make this quantity as small as possible, or, in other words, to diminish the size of the units, the antitoxic value of the serum is raised as far as practicable by injecting the horse as many times as possible.

As already intimated the animal body has the power to produce certain substances that will defend it against all sorts of alien cells and their products. But the nature of these substances is unknown. And yet we know that they are able to neutralize poisons, agglutinate cells, cause precipitation and coagulation, etc. These antibodies are classed as antitoxins, agglutinates, precipitates, coagulins, etc. Those that destroy cells are classed as cytolytins, and this includes the bacteriolysins (bactericides), and the hemolysins, which destroy the red blood corpuscles. There are also a number of other destructive substances known generically as lysins, but having specific powers. Such anti-substances are produced by

¹ In bacteriolysis the bacteria are dissolved, in hemolysis the red blood corpuscles are dissolved. In leucolysis, the white corpuscles are dissolved.

the repeated inoculations of an animal with small doses of the substances against which it is desired to obtain the anti-substance. By this process, however, more than one anti-body can be formed. For example, repeated inoculations of a rabbit with typhoid bacilli cause the rabbit's serum to have not only bacteriolytic, but also agglutinin properties. The substance that causes agglutination was discovered by Pfeiffer¹ who found that if mobile cholera organisms were introduced into the peritoneal cavity of guinea-pigs immunized against cholera they would become motionless, adhere together ("clump"), become granular and eventually disappear; but he also found that similar "clumpings" would take place when typhoid bacilli were injected into an animal immunized against typhoid fever. Bordet² simplified the procedure when he discovered that "clumping" could be produced in a test tube, if the immunized serum were added to a broth culture of the microorganism. In the test tube, however, no granules were found in the bacteria, nor did they disappear. In fact, after some hours, usually about twenty-four, the clumps broke down, the bacteria resumed their activity and began to multiply. In Pfeiffer's method, therefore, the serum is agglutinin, and also bacteriolytic; in Bordet's it is only agglutinin.

The discovery of "clumping" or agglutination has been of the greatest value, and forms the basis of the Widal test in typhoid fever. It is true it may be found, to some extent, in normal sera, and other organisms besides those of Asiatic cholera and typhoid fever will agglutinate, but the phenomenon is so imperfectly marked that it has not been regarded as seriously affecting the value of the Widal test.

The Widal reaction, as is well known, is as follows: if equal parts of a serum and of a solution containing typhoid bacilli are mixed together, it will be found in a large number of instances that agglutination takes place, no matter what kind of serum is used, and this agglutination will continue for hours. But if the serum is greatly diluted and the time limit fixed at an hour, the typhoid bacilli will be agglutinated only by serum derived from an individual in whom typhoid bacilli have been growing.

In the Widal method, serum from the suspected patient is mixed in various degrees of dilution with a cultivation of proved typhoid bacilli, and the time limit is fixed at one hour. If agglutination is marked within that time in a dilution of 1 to 50 or more, the reaction is said to be present. The greater the dilution the serum will stand before its agglutinating powers are lost, the greater the certainty of typhoid fever. In human patients agglutination will often occur when the dilution is 1 to 100 of serum.

But after all, this determination of the specific character of a disease by the agglutinating process has its limits.

For example, there are some sorts of the colon

bacillus that will agglutinate in high dilutions. Blood serum also in jaundice often agglutinates typhoid bacilli in high dilutions, but this may be explained from the fact that cholangitis is often due to typhoid bacilli. Again, the reaction to this test may continue for many years. These facts should be taken into consideration in our valuation of the Widal test.

The following theories of immunity are the most important.—*The Exhaustion Theory*¹ holds that when an infective disease has exhausted the "pabulum" on which the disease feeds, there is immunity.

The Retention Theory holds that acquired immunity is due to storage in the body of bacterial products which prevent the growth of that variety of bacteria that produced them.

The Phagocytic Theory of Metchnikoff was and is based on the theory that the cells of the animal kingdom protect themselves from invading cells by devouring them (phagocytosis). Accordingly immunity from a disease means that the phagocytes of the infected animal are able to devour the attacking bacteria. Susceptibility implies that the invading bacteria are able to overcome the phagocytes. Phagocytosis is really a phenomenon of the animal kingdom that is generally recognized, hence analogically there is a basis for it. According to Metchnikoff the leucocytes and endothelial cells are to be classed among the phagocytes. This theory has been successfully attacked, however. In the first place, in many infective diseases, bacteria are not eaten up. Indeed, bacteria may, as in gonorrhea, survive the cells that have swallowed them. In fact the cells are often attacked by bacteria, rather than the converse. Besides, the so-called phagocytes may actually help to spread the disease by carrying the bacteria to remote parts of the body. This theory has, therefore, no universal application, though partly true.

The Humoral Theory propounded by Fodor² holds that bactericidal properties exist in many fresh specimens of blood serum, and that the anti-bodies,³ known also as defensive substances or alexins are of a chemical nature; and that they induce immunity. There is no proof; however, that they have a chemical nature. Besides it is pretty certain that cells have something to do with infection.

The Cellulo-Humoral Theory has aimed to unite the theories of the phagocytic and the humoral schools, in other words, the French and the German.

Both cells and fluids are concerned in natural and artificial immunity. Immunity is due, not only to substances related to the blood of the immun-

¹ Theories are stated as they were originally propounded.

² Fodor, Deutsch. med. Woch., 1897, p. 745.

³ According to Buchner and Hanks these anti-substances are proteids. They are called sozins, if present in the normal serum; phylaxins, if the result of immunization. Sozins destroy both blood cells and bacteria, and are themselves destroyed by a temp. of 131° F. If they successfully oppose the bacteria, they are called mycosozins, if the toxins, they are called toxo-sozins. The phylaxins, or true antitoxins destroy neither blood cells nor bacteria, and retain their properties after exposure to 176° F. If the true antitoxin counteract the bacteria, they are called mycophylaxins; if the toxins, they are called toxophylaxins.

¹ Pfeiffer, Zeitschr. f. Hyg., Vol. XXI, 1896.

² Toxins and Antitoxins. Annales de l'Ins. de Pasteur, Vol. XVII, 1902.

ized animal, but also to its tissues and juices. These substances are formed by the cells of the body during exposure to the toxins, and for a while afterward. But they are not formed by any one variety of cell, but more or less by all the cells of the body.

These protective substances meet and resist the bacteria and their toxins. Stimulated by the bacteria, they produce anti-bacterial substances, while the toxins stimulate the same cells to produce antitoxins.

Ehrlich's Side-Chain Theory was promulgated in 1897, and is the most recent of the methods by which an effort is made to utilize established facts to explain the process. The fundamental idea of Ehrlich is that the protoplasmic body, or the cell (in other words) is a complex structure, consisting of a central body with lateral processes (side chains he calls them), that are capable of combining with or being replaced by other bodies.

This idea is based on an analogous condition recognized in organic chemistry, which is used to explain the relations of iso-meric compounds. Ehrlich holds that the cell (protoplasmic body) is capable of forming a vast number of these processes or side chains, and that a separate process can be formed for every blood or cell poison that exists. These processes he calls *receptors*. Each receptor is capable of dealing with a single body, whatever its character or chemical composition, whether solid or fluid; but it has a double function, one of attaching itself to a protoplasmic molecule and the other of inoculating the cell.

The fixing agent is called the *Haptophor* (anchoring agent); the inoculating, the *Toxiphor*.

If the poison is very virulent the cell is destroyed, and if many cells are damaged, the animal may die. If however, the animal survives, the damage done to the cell process (receptor) calls for a new formation of processes similar to those that have been injured. Now, the reproduction of cells to compensate for loss is a recognized pathological principle. Accordingly he assumes that a proper stimulus imparted to a cell will lead to an overproduction to compensate for the loss of substance, while a number of the receptors would be thrown off into the blood and lymph. *These cast off receptors* would then be the antitoxins.

In passive immunity we have to consider some problems involving bacteria that do not to any marked extent produce soluble toxins, samples of which are the bacteria of cholera and typhoid fever. When these microorganisms are destroyed by the serum of an immunized animal it is supposed that their disintegration is due to the co-operation of two substances, an intermediary (or immune body)¹ and a complement,² because the normal serum which contains only the complement has no effect on the bacteria.

The immune body resists heat, the complement is destroyed by it, but the two must be conjoined so as to produce destruction of the bacteria (bacteriolysis).

Immune bodies may possibly be derived from the cells of immune animals. They vary according to the specific organism. There may be various kinds of immune bodies and complements. Disintegration of bacteria by blood sera also; is largely dependent, it is thought, on the joint action of the complements and intermediary bodies.

In discussing the subject of passive immunity, however, we are brought face to face, not only with a question difficult in itself and very largely theoretical, but complicated by the use of many new terms that are not in general use.

Add to these facts that many of them are synonymous, while the same word may have different significations with different writers, it is clear that the subject has passed beyond the bounds of intelligent discussion, at least so far as many of us are concerned.

It would not be profitable, therefore, to undertake any extended discussion of this subject at the present time, even if the limits of this paper admitted it. It is sufficient to say in conclusion that, according to Ehrlich's theory; if immunity has been *acquired*, his explanation is as follows: The receptors circulating in the blood anchor any of the corresponding toxin molecules before they can reach the cells. And in passive immunity the serum of the immunized individual injected into another individual supplies him with these receptors, and thus confers on him protection against infection.

So far as the clinical side of the attack is concerned, incubation would include both the period when the toxin molecules are grasping the receptors of the cells and also the period during which the toxiphoric agency is acting (the stage of invasion). When the antitoxin formation begins to be established the disease is beginning to yield; where it gains the upper hand, convalescence is at hand.

Now as to the question of *Natural Immunity*. According to Ehrlich either the cells are developing so many receptors that there are always enough in the blood to anchor any toxins or molecules and prevent them attacking the cells, or the cells may have no receptors (processes) fit to grasp the toxin-haptophors. Besides, there must be the right kind of receptors and the right kind of haptophors, and they must be capable of adapting themselves to one another as keys and locks. Thus, for example, the toxins of tetanus tend to affect only the cells of the nervous system.

Ehrlich's theory has of course met opposition, and it will doubtless be modified to meet reasonable objections. But it is convenient for us to accept it provisionally as a good working hypothesis that will be helpful in discovering the principles that govern immunity, whatever they may be.

Latency in Infective Disease.—Latency in dis-

¹ The complement is an unstable body destroyed at a temperature of about 140° F., and known also as an alexin, defensive substance, addiment, cytase.

² Also known as amboceptor, sensitizer, desmon, copula, phyto-cytase, etc.

ease has long been recognized. Several explanations are offered. The infecting agent must have been all the time in the system, manufacturing toxins, though not in sufficient amount or quantity to insure symptoms; or the microorganisms may have been in the body in an inert condition, that is, incapable for a time at least of active development.

Now, the latter condition actually prevails in nature. For example, in febrine, a silkworm disease, the pathogenetic microorganism can actually be seen in the eggs. But they do not develop until the growth of the caterpillar begins. In the germ stage of the caterpillar they are quiescent (Lazarus-Barlow).

A relapse, as in typhoid or malaria, is really a fresh access of the disease. How then can we explain these attacks at a time when the patients are presumed to have acquired a certain degree of immunity? So far as typhoid is concerned the explanation may be that the typhoid germs were temporarily locked up.

Thus, in typhoid fever Chiari found of 22 cases taken consecutively, that there were typhoid bacilli in the gall-bladder in 19, and in 13 of these cases the gall-bladder showed hyperemia, edema and infiltration of its walls.

Hence typhoid bacilli must have been locked up, and multiplying have formed these toxins, which could not be discharged owing to the inflammation of the ducts. With the patency of the passages they were discharged into the intestine in such numbers and perhaps endowed with such unusual virulence that they broke down the immunity that was being developed in the cellular tissues.

Now, just such a condition sometimes prevails in the horse when he is being immunized against diphtheria. For an excessive dose either of a toxin or of bacteria, can actually lead to symptoms of the very disease against which the animal was being prepared, notwithstanding he had already attained a fairly high degree of immunity.

In prosecuting the study of these subjects, much has been done, but only by protracted investigations of the most elaborate and painstaking character, while much more remains to be done in the future.

This work, however, can only be done by experts, educated and trained to laboratory methods, and conversant with all the facts and theories that are afloat, and also with the use and misuse of the many self-coined words that investigators have thought necessary to use in expressing their ideas.

And yet it is none the less true, that out of all the present obscurity, facts of great practical importance are being gradually secured.

Already therapeutic principles that have saved countless lives have been established by these researches. But they should be prosecuted with more vigor. In fact, medicine offers the modern philanthropist no larger opportunities, than the prosecution of these subjects by trained men, provided with all the appliances necessary for scientific investigations.

NOTES ON THE EPIDEMIC OF CEREBROSPINAL MENINGITIS.^{1,2}

BY HENRY DWIGHT CHAPIN, M.D.,
OF NEW YORK.

EARLY in March of this year, cerebrospinal meningitis, which is endemic in this city, began to increase in the number of those attacked. A glance at the deaths reported from this disease last year in comparison with those reported during the same months of this year shows such a marked increase as to justify us in considering it epidemic. The figures here quoted were kindly furnished by the Health Department.

Deaths from Cerebrospinal Meningitis.—

During week ending	March 19, 1903....	6	1904....	16
" " "	" 26, "	7	"	13
" " "	April 2, "	5	"	31
" " "	" 9, "	9	"	30
" " "	" 16, "	5	"	45
" " "	" 23, "	5	"	55
" " "	" 30, "	7	"	70
" " "	May 7, "	6	"	76
" " "	" 14, "	4	"	94
" " "	" 21, "	10	"	69

In the limits of the short paper requested by the President, only a few of the salient points can here be enumerated. It is difficult to briefly draw a clinical picture of a disease so marked by irregularity in its manifestations, but an attempt will be made from a study of cases seen by the author and those reported by colleagues in the various societies. The onset is fairly abrupt, differing markedly in this respect from all other forms of meningitis. In getting a history it is usually possible to date the time of the beginning of symptoms to within a few hours, or even within sharper limits, before which time the patient has been apparently in good health. Generally there is vomiting, chilliness and rigors in older subjects, and frequently severe convulsions. The severity of the initial symptoms is apt to stand in some relation to the type of the attack. Thus prolonged convulsions quickly followed by coma will warrant a grave prognosis. There are exceptions, however, to this rule, as exemplified in a child of 2½ years, recently seen, who had convulsions at the onset lasting, off and on, for four days, and yet she made a good recovery in between two and three weeks. If stupor or coma quickly follow the convulsions, the case will be apt to be severe. In patients old enough to describe symptoms, complaint is made of severe pain in the head and back of the neck. The typical retraction of the head is an early symptom, usually noted on the second or third day. In very mild cases, this may not be so marked, but in average and severe cases, the rigidity is often extreme and hard to overcome. The posture of the patient at this time becomes characteristic, and, with the opisthotonos, the thighs and legs, and even the arms and hands, are apt to be in a condition of more or less extreme flexion. The contraction and rigidity usually continue during the course of the disease. After this characteristic beginning, cerebrospinal meningitis is most

¹ Read before the Medical Society of the County of New York, May 23, 1904.

² Received for publication, May 23, 1904.

irregular in its manifestations, particularly in the epidemic type. Cases that appear to be rapidly proceeding to a fatal ending may suddenly improve, and those that do not show very urgent symptoms may just as suddenly and unexpectedly die. A glance at some of the clinical features noted during the course of the disease as here given has been taken largely from cases studied in the children's ward of the Post-Graduate Hospital, with the kind permission of Dr. Caille, who is at present on duty. With reference to the nervous system, convulsions may first be noted. As already stated, the clonic spasms occur early in the disease, but they may be severe and persistent. In one case a baby of three months had repeated convulsions covering a period of five days, and in a case previously mentioned this alarming symptom lasted four days. It is unusual to have convulsions later in the disease. The tonic spasm of the muscular group at the back of the neck is one of the most constant features, with little or no relaxation until late in the disease. Hyperesthesia of the skin is noted, as in all forms of meningitis. The patients show every evidence of discomfort on being disturbed, partly from this cause and partly from aggravation of the pain in the head and neck. The mental state runs the gamut from apathy and indifference to great irritability, delirium, drowsiness, semi-stupor, stupor and coma. Some of the cases went directly from convulsions into stupor and this is very apt to take place. Kernig's sign may be recognized in nearly every case. All of the cases in which the blood was examined exhibited more or less leucocytosis.

The temperature and pulse show remarkable variations and present no characteristic features aside from this variability. There is no apparent cause for these wide fluctuations. One case, a child $3\frac{1}{2}$ years old, is worth special mention. On one occasion the temperature rose to 108.6° F., once to 106.4° F., and three times it was above 105° F. The pulse varied from 100 to 160 and the respiration from 24 to 48. There was initial vomiting, followed by irritability, rigidity of the neck and then marked apathy. An ounce of turbid fluid was withdrawn by lumbar puncture and the *Diplococcus intracellularis* found. Leucocyte count, 21,200. Dr. Davis found neuroretinitis in both eyes. The child is now convalescing favorably. Another case, $6\frac{1}{2}$ years old, had a temperature of 106° F. and 107° F. on the second and third days respectively, after which it gradually dropped to 99° F., the pulse varying from 150 to 85 and the respiration from 44 to 24. An ounce and a half of turbid serum removed by lumbar puncture and *Diplococcus intracellularis* found. Eyes normal. This case has so far done well. Another case, $3\frac{1}{2}$ years old, started with vomiting and convulsions, followed by delirium. During fifteen days the temperature varied between 103.2° F. and 98.6° F., when it rose to 106.4° F. and the child became much worse. As he was apparently dying, the parents wished him removed to his home. Lumbar puncture dry.

Mild neuroretinitis of both eyes with dilatation of blood vessels.

While the temperature is thus most irregular and may reach an extraordinary height, some cases may run their course with little increase of temperature. The pulse, while variable, is not apt to exhibit the marked intermissions so frequently seen in other forms of meningitis. The respiration likewise differs from ordinary meningitis in not usually being so irregular and sighing.

In previous epidemics there have been cases of croupous pneumonia reported as occurring during the time that cerebrospinal meningitis was prevalent. The frequency, severity and mortality of pneumonia during the past winter and spring have been noted by all physicians in this locality, thus corroborating previous experience in this respect. The skin seems seldom to be involved in the present epidemic. No case has been seen by the author exhibiting the purpuric spots over the body, from which the old name "spotted fever" was derived. In conversing with others who are seeing cases, the rarity of the eruption has been likewise noted. The eyes are often more or less involved, with dilatation or inequality of the pupils and sluggish response to light. In four cases seen by the author there was a mild neuroretinitis of both eyes and in one case dilatation of the retinal veins on both sides was reported. It is possible for all the structures of the eye to become inflamed, with consequent loss of sight. Some cases exhibit a mild grade of conjunctivitis. The ear is likewise involved in a certain proportion of cases. A subacute inflammation may take the form of an otitis media or an involvement of the labyrinth, followed by deafness.

The general course and duration are most irregular. A mild case may go on to recovery in two weeks, while severer ones last many weeks and even months. The patient may get in a condition of extreme prostration and emaciation and yet gradually go on to recovery. Unfortunately there are cases where the brain is permanently crippled by the ravages of the disease and the patient never regains his former mental and physical strength. The special senses may likewise suffer loss or permanent disability.

The cause of the epidemic form of cerebrospinal meningitis is recognized to be the *Diplococcus intracellularis*, which is found in the fluid procured by lumbar puncture. This fluid is usually turbid when drawn. The diplococcus was found in all the cases thus examined except two, one of the latter giving a dry puncture and the other a clear fluid, the culture from which gave no growth. The manner in which this germ gains access to the cerebrospinal meninges as well as its port of entry appears to be uncertain. The nasal secretions are now being studied, the results of which will doubtless be given in due time by the bacteriologists. In one case, a baby of three months, some turbid serum drawn from the spinal canal showed the diplococcus and an eye-smear was reported to exhibit gonococci or the diplococcus of meningitis. As the eyes were

normal to examination, the latter was evidently the germ recognized. Several mild cases have only been recognized positively as cerebrospinal meningitis by the results of the lumbar puncture. In one case, a young infant, with an obscure history, was admitted to the hospital and, after an examination, there was a question as to diagnosis, as there were no characteristic symptoms present. A lumbar puncture was then performed and the diplococcus found, in the absence of which no positive diagnosis would have been made. Doubtless in this epidemic, as in preceding ones, some mild cases are never correctly diagnosed, especially in young infants. There are no means of knowing how many such cases occur, hence it is very difficult in this as in other epidemics to state the relative mortality of the attacks in different years. We know, however, that the death rate is high. In the epidemic of 1872, 782 deaths were reported during the year in New York, and in 1881, 461 deaths. This included only what now forms the Borough of Manhattan, with a population then much smaller. The disease does not seem to be limited to any one section of the city, but, generally, it occurs in the poorer quarters. It seems to attack by preference those living in unfavorable hygienic surroundings, or those whose systems are exhausted, especially if they live in a depressing environment. While the spread of this disease is certainly a calamity, there does not seem to be occasion for undue alarm in the public mind. The Department of Health is studying the epidemic and doing all in its power under the conditions to find out how the disease extends and acts. It does not behave like a contagious disease that spreads from one adjacent point to another, frequently being traced by transportation, but rather appearing in comparatively isolated localities. Most of the epidemics in this country and Europe have extended principally in winter, so that, reasoning by analogy, the onset of warm weather should have a favorable effect in checking the epidemic's influence.

THE CLINICAL FEATURES OF CEREBROSPINAL MENINGITIS, OR CEREBROSPINAL FEVER OF THE EPIDEMIC TYPE.^{1,2}

BY HENRY KOPLIK, M.D.,
OF NEW YORK.

DURING the past few years additional interest has been given to the study of cerebrospinal meningitis of the epidemic form, due mainly to the investigations, on this side of the Atlantic, of Councilman and his pupils, Osler and others. A severe epidemic of this disease in Boston (somewhat over a hundred cases) has given Councilman an opportunity to study thoroughly the disease from an epidemiological as well as from a pathological standpoint. Osler has been able to study a number of cases occurring in an outbreak in Baltimore.

During the past five years there have been yearly outbreaks of this disease in New York, culminating in an extensive epidemic in the spring of this year. I have thus been able to study quite a number, some 37 cases, of the disease at the bedside, and to analyze carefully its clinical features. In this study I have utilized 77 cases of meningitis occurring in my service in the Mount Sinai Hospital, New York. These 77 cases were divided into the following groups: 37 cases of cerebrospinal meningitis of the epidemic type—21 of which were substantiated by culture and cover-glass spread to be due to the *Meningococcus intracellularis*. Of the remaining cases of the epidemic form, some were not substantiated by lumbar puncture being clinically self-evident; others were so-called dry taps; 35 cases were of the tuberculous form of meningitis, as substantiated absolutely either by post mortem or guinea-pig experiment, or by discovery of tubercle bacilli in the lumbar puncture fluids. One case was a so-called staphylococcus meningitis; one case, primary pneumococcus meningitis; one case, streptococcus meningitis. In two cases, so-called pseudo influenza bacilli were found.

In the above statistics I have not utilized 15 cases of cerebrospinal meningitis which belong to the epidemic of the present year. Of these 15 cases, 5 died; of the remaining 10, 5 are still in my ward convalescing. Some of these cases were so classical and self-evident, or the symptoms improved so steadily that they were not subjected to lumbar puncture. The ultimate fate of the remaining cases cannot be stated as yet.

Age.—The ages of the patients affected with epidemic cerebrospinal meningitis confirm the assertion that this affection is a disease of young people. Sixty per cent. of the cases were under two years of age; the youngest was four months of age; 77 per cent. of the cases were under four years of age, the oldest child being fourteen years. The average age was two years. In tuberculous meningitis, however, the average age was somewhat higher, only 41 per cent. of the cases being under four years of age, the average age being four years and four months.

Classification.—In looking over the literature on the subject of meningitis, the most lucid classification is given by Osler. He divides the classification into primary and secondary forms, which will be accepted by all. The primary forms include cerebrospinal fever, both of the sporadic and the epidemic types, and as a separate disease the pneumococcus meningitis. In the secondary forms he includes the tuberculous, the pneumococcus meningitis; the latter being secondary to pneumonia, endocarditis, disease or injury of the cranial bones. Third, there are the pyogenic forms, due to staphylococci, the streptococci, or secondary either to disease of the cranium or local infections. Fourth, are met the forms secondary to typhoid fever, influenza, diphtheria, gonorrhea, anthrax, actinomycosis. Fifth, Osler would include in a separate rubric the so-called serous meningitis, which I may say is to-day being

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² Received for publication May 18, 1904.

recognized as a secondary form of the disease, due possibly to infection by streptococci or pyogenic organisms. This classification, it will be seen, recognizes both the sporadic and the epidemic forms of cerebrospinal fever as being the same disease and due to the same essential cause.

My own cases are of the primary form of cerebrospinal fever of the epidemic type, including at least one form which may occur sporadically, the so-called posterior basic meningitis of Still.

Bacteriology.—The bacteriological features of my cases were worked out in the laboratory of the Mount Sinai Hospital, under the supervision of the pathological staff. Referring to a report of this work, by E. Libman, published in the Mount Sinai Hospital Reports of this year, it will be seen that all the cases were examined culturally. Reliance was not placed on cover-glass stain alone. All the cultures corresponded to those described by Weichselbaum. None of them, however, showed Gram positive diplococci. There was a variation in the growth on media not containing serum; but when this growth was obtained on such media, it was never profuse.

The conclusion is that there is one type of the *Diplococcus meningitidis* in the New York cases of cerebrospinal meningitis. This type corresponds to that found by Councilman and Wright in Boston; and Osler and Hirsch in Baltimore, and Herrick and others in Chicago. Both the nasal discharges and the conjunctival secretions were studied and in one of my cases the presence of the meningococcus was proven to be present culturally in the conjunctival inflammatory discharge. In this case there was a distinct history of conjunctivitis preceding the attack of meningitis, and the diplococcus was also established in the cerebrospinal fluid. We have never proven the presence of the meningococcus in the secretions and discharges of the nose. We have found, however, the *Micrococcus catarrhalis*, an organism which closely resembles the meningococcus, whose cultural characteristics we will not enter into, but refer the reader to the extensive investigations of this organism by Dr. Celler, my former assistant, and published in the Mount Sinai Hospital Reports of this year.

Clinical Types.—The clinical picture presented by children suffering with cerebrospinal meningitis of the epidemic type is quite characteristic, not only in its onset but in the general course of the disease. I have been able to differentiate certain distinct types in the cases occurring in my hospital service and consulting practice. Previous to the present epidemic in New York, the malignant cases during the past four years have not been as common as they were during the present year. I have recently seen a number of cases presenting the malignant form in which children in previous good health are attacked with the disease, and die within twenty-four or thirty-six hours.

The following case, one of the first of this year's epidemic, is quite a characteristic example of this type of the disease: An infant twelve

months old, nursed at the breast, perfectly formed, a large, healthy, bright child, never previously affected by any illness; nursing and bowels normal. On the morning previous to the day on which I saw the case with the family physician, the child appeared sleepy, stupid and refused the breast. It vomited, but was not feverish. That evening the physician was called in and found the infant quite drowsy and listless, with a temperature of 103° F., pulse 110 and very weak. There was no peculiarity about the eyes, no stiffness of the muscles of the neck or body. At 3 and 5 A.M., on the following day the child awoke crying and the mother discovered some red spots on the cheeks. The face was slightly swollen, the eyes staring, and the child was apparently blind. By 8 A.M., the entire face, hands and body were covered with blotches which turned bluish; the tissues of the extremities seemed to be hard and swollen; the buttocks and body looked as if the child had been beaten, ecchymosis being quite extended over the body and extremities when I saw the child. At this time the temperature was 101° F. and the pulse very weak, scarcely to be felt at the wrist; the lips were blue; the reflexes abolished. When I saw the child she had no rigidity of the muscles of the neck; there was no Kernig symptom; the pupils were uneven and did not react; there was a slight conjunctivitis; an examination of the lungs, abdomen and ears gave a negative result. The breathing was irregular and catchy, the pulse very rapid and scarcely to be felt at the wrist. The diagnosis of cerebrospinal meningitis was confirmed by a lumbar puncture, made post mortem, a cloudy fluid, milky in color, being drawn off, and the intracellular diplococcus of Weichselbaum being found in the fluid, both by stain and culture.

Since seeing this case, I have seen at least three others, each presenting similar features. In two of these rapidly fatal malignant cases the hemorrhages thus mentioned were preceded by an erythematous rash.

Another type of cerebrospinal meningitis is more commonly met with in which a child in apparent health is suddenly taken with dizziness or vertigo, vomiting follows, accompanied by severe headache, and then the child passes through the different phases of the disease which are well known and described in books on the subject.

A more puzzling type of cerebrospinal meningitis in infants and young children is that in which a child in apparent health is suddenly found to have a temperature; is restless, refuses the breast, vomits once or twice, and then for weeks will run an intermittent type of temperature, as high as 104° or 105° F., falling to the normal or subnormal daily. In the intervals of freedom from temperature the children or infants will play, and then when the temperature rises they may complain of slight headache, become drowsy, irritable and refuse nourishment. In these cases the typical signs of meningitis are not always present. The delirium may not be constant or may not

extend over the twenty-four hours. The rigidity at the back of the neck may not be very marked, especially in young infants. In these cases also, the children may not have a marked Kernig symptom, especially if below two years of age. The most characteristic feature about these cases it seems, is the prolonged period of temperature of an intermittent type closely resembling malaria. In fact, the attending physician in many of these cases has examined the blood for the malarial plasmodium; or attention has been drawn by the intermittent type of the temperature to the ears in the hope that some focus of suppuration would be found. In other words, these infants and children may continue over a period of weeks with this peculiar temperature, and the onset of the disease has not been marked by convulsions or any of the classical symptoms of meningitis; and still a lumbar puncture in these cases will reveal the presence of the intracellular meningococcus in the fluid thus obtained.

In young infants, the type of the disease most commonly met with is that in which the onset is sudden, marked with general convulsions, high fever, vomiting at the outset, the high fever of the intermittent or remittent type, continuing over weeks. After the fever has lasted for some days or weeks, the mother will notice the rigidity of the head, the irritability of the child and the marked emaciation.

The Mode of Onset.—In all the cases that I have had an opportunity to study in hospital service, in which the diagnosis was confirmed, the main characteristic of the onset of the disease was that it was abrupt. Observation has shown that children in apparent health would suddenly be attacked by the symptoms just detailed. In only a small percentage of cases has there been a doubtful history of the sudden onset. In this respect, the disease differs markedly from the meningitis of the tuberculous type, which is of slow onset, and in only a small percentage of cases is such a history doubtful.

Neck Rigidity.—Great stress has been laid by some authors on the presence or absence of neck rigidity. As has been hinted, there are some cases in which rigidity is not present at all times; but if these cases are observed for any length of time, our experience shows that slight or marked rigidity is present at one time or another in all cases of cerebrospinal meningitis. Opisthotonos is present in about 70 per cent. of the cases. In the posterior basic forms, of which we will speak later, the rigidity and opisthotonos is so marked that the child will assume the position seen in tetanus, being perfectly rigid, curved backward, the forearms extended, the fingers clenched in the palms; these are cases which only form a small percentage of the total number seen in an epidemic, and they affect mostly younger infants and children. According to Osler, neck rigidity or opisthotonos was not present in the adult form of primary pneumococcus meningitis. Rigidity was present in my own case of primary pneumococcus meningitis confirmed by autopsy. In our

case, not only was rigidity present but also opisthotonos.

Reflexes.—In a majority of cases of epidemic cerebrospinal meningitis, the skin, tendon, and plantar reflexes were present in the early stages of the disease, but were apt to disappear in the rapidly fatal case, or in moribund cases.

The Babinski Reflex.—Babinski, a French neurologist, described the extension of the great toe on irritation of the plantar surface of the foot as a characteristic sign of disease of the pyramidal tracts or the lateral columns of the cord, and we have studied this sign in the forms of meningitis coming under our notice. We have found that in meningitis of the epidemic cerebrospinal type, it was present in 4 of 25 cases studied. This is in marked contrast to what is found in tuberculous meningitis, in which this reflex was absent in only 6 cases of the 26 in which it was sought. In other words, it was present in 77 per cent. of the cases of the tuberculous form of meningitis, and I regard the presence of this reflex as a valuable addition to the clinical picture of tuberculous meningitis as distinguished from cerebrospinal meningitis of the epidemic type. I can only explain its constancy in tuberculous meningitis by the fact that in these cases there is possibly an invasion, either directly or indirectly, of the pyramidal tracts or the lateral columns of the cord by the disease. The sign is of very little value, however, in children and infants below two years of age, for it may at times be seen in perfectly normal infants, or in those suffering from various affections. This seems also to be the conclusion reached by Morse, of Boston, who contends that the Babinski sign is quite inconstant in its manifestations in infants and children below two years of age.

The Kernig Symptom.—Much has been written about this very interesting symptom, the contraction of the flexor muscles of the lower extremities, as seen in cases of meningitis. I have found that the Kernig symptom is of very little utility in infants and children below two years of age. Of course, in infants, especially under one year, there is a normal tendency toward myotonia. Even superficial observation will show that normal infants are apt to lie with their lower extremities flexed, assuming very much the position of the fetus in utero. In children below two years of age suffering from meningitis, the irritability is so great that it is impossible to come to any conclusion as to the presence or absence of the Kernig symptom. In all the cases of cerebrospinal meningitis of the epidemic type above two years of age, therefore, the Kernig symptom was present. In cases of tuberculous meningitis, its presence was not so constant, being absent in eight cases of 26 in which it was sought. I do not lay too great stress upon the presence of the Kernig as a pathognomonic sign of meningitis. It may be present in cases of which we are accustomed to say that there are cerebral symptoms without meningitis as in typhoid fever or pneumonia.

Hyperesthesia and Mental Irritability.—In the

majority of cases of epidemic cerebrospinal meningitis, after the usual symptoms have set in and the disease is well inaugurated, the children, and even infants, are irritable, refuse to be comforted, start at the least sound in the room, lie mostly on the side, the arms and lower extremities flexed, the body taking the crouching position. Any attempt to disturb the patients is met with resistance. In the present epidemic, although many cases have been exceedingly mild, hyperesthesia of the surface, and irritability of the mind was very marked in all cases. In past epidemics of 21 cases hyperesthesia of the surface was quite marked in fully 62 per cent. of the cases.

In marked contrast to the above is the absence in the tuberculous form of the disease of any reaction or hyperesthesia of the surface. The child lies in a stuporous condition, does not notice its surroundings; whereas in the epidemic cerebrospinal meningitis, when not comatose, the children are alive to their surroundings, or are irritated by some things passing on around them. In the tuberculous forms of meningitis, hyperesthesia was present in only three of 34 cases. In other words, it was absent in 90 per cent. of the cases.

The MacEwen Sign.—MacEwen has pointed out that in children in various forms of meningitis we obtain on percussion a hollow note over the anterior horn of the ventricle. If the head is so held that the anterior frontal or parietal bone may be percussed over the situation of the anterior horn of the ventricle, this note will be produced. That is, if the patient sits upright and the head is inclined to one side, percussion of the inferior frontal or parietal bone will give a tympanitic note.

I have found that in 17 cases of tuberculous meningitis in which this note was sought, that it was present in 11, and it has seemed to me to be exceedingly valuable in making up the clinical picture of the tuberculous forms of meningitis. MacEwen thinks that the note is caused by the presence of fluid, so-called hydrocephalus, in the ventricle. In meningitis of the epidemic cerebrospinal type, however, this note is not obtained in the majority of cases. In 13 studied with this object in view, it was present in only two, showing the difference in this respect between the two forms of meningitis. In other words, if MacEwen is correct, there is very little distention of the ventricle with fluid in the first stages of the disease. In the chronic cases, however, with an increase of fluid in the ventricles and these are the cases in which the note was obtained I have found quite a marked MacEwen present.

Facial Paresis.—As is well known, facial paresis is quite a constant feature of the tuberculous forms of meningitis, and in 35 absolutely substantiated cases of tuberculous meningitis, it was found in 19 early in the disease; and it appeared toward the close in most of the cases. In epidemic cerebrospinal meningitis, however, facial paralysis occurs only in the severest types of the disease where the intracranial pressure to one side or the other, especially at the base, is quite

great, and in 21 cases in which it was looked for, facial paralysis, marked or slight, was present in only three cases.

Temperature.—One of the prevailing types of fever in children in the cases we have observed was that of the intermittent type, in which the temperature would be quite high at some time of the day, and normal or subnormal at another. The range of temperature would sometimes be very marked, four, five, six or eight degrees. In one case which I have under observation of the basic form of Still, the temperature reached fully 106° to 106.5° F., falling to normal or subnormal at some time during the day. The temperature curve in epidemic cerebrospinal meningitis cannot be said to be characteristic, and at times will exhibit the wildest irregularities.

The Skin.—In most of my cases I have not been able to find the prevalence of the rashes described by most authors. This is due, possibly, to the fact that in the epidemics I have observed, skin rashes and eruptions were not common. On the other hand, herpes, referring especially to herpes of the lip, is also not very common, and was present in only two of 20 cases. In the adult, however, Osler has found petechiae, erythematous rash, or herpes, in 13 of his 21 cases. In the epidemic of this spring I have observed a number of cases in which a roseola, closely resembling that seen in typhoid fever, was present. Lately I have seen a number of cases with a profuse petechial rash at the outset of the disease.

Eyes.—Contrary to what is the generally accepted opinion, we have found that expert examination of the fundus revealed no changes in the optic papilla in the majority of our cases of cerebrospinal meningitis, although in some there was dilatation of the veins, or congestion without neuritis. In only one case was there descending neuritis. In a group of 26 cases of meningitis of the tuberculous variety, examined by our expert, Dr. Gruening, some change was found in fully 77 per cent. of the cases. This change consisted either of an optic neuritis or papillitis, or the presence of tubercles in the choroid. In this group of 20 substantiated cases of tuberculous meningitis, 7 showed tubercles in the choroid. It would seem, therefore, that the condition of the fundus, aside from the positive discovery of choroid tubercle, gave us important presumptive evidence of the nature of the meningitis.

The Blood.—Every case of meningitis coming under our observation, including those of the cerebrospinal epidemic type, has been examined with reference to the leucocytosis present. The leucocyte count in all of our cases was made at intervals of three days in the course of the disease. In all of the cases of epidemic cerebrospinal meningitis there was leucocytosis to some extent. The leucocytosis was of the polynuclear type, the leucocytes ranging from 20,000 to 55,000, exceeding 25,000 to the cubic millimeter in fully 55 per cent. of the cases. The lowest leucocyte count in any case was 11,100 to 12,000 to the cubic millimeter.

This corresponds very closely to what was found by Osler to be true of the adult cases. In the tuberculous forms of meningitis in infants and children, we have not always found a so-called leucopenia. On the contrary, in fully 40 per cent. of the cases there was a leucocyte count of 20,000 to 25,000 to the cubic millimeter; and under 20,000 in 60 per cent. of the cases. In no case, however, did the leucocyte count exceed 24,000, except in one case of tuberculous meningitis, in which we obtained a leucocyte count of 32,000. The leucocyte count which has just been mentioned (with the exception of the one last referred to) having been made in 26 substantiated cases of the disease, would seem to be an important feature, if we compare it to what is true of the adult. In Osler's cases of tuberculous meningitis, leucocytosis was absent in only three cases; his highest count (24,333) corresponds so closely to what we have found true of our own cases in infants and children, that we are apt to be led to the conclusion that a higher leucocyte count in tuberculous meningitis is exceptional, and, if higher, would speak more for a meningitis other than tuberculous in any given case.

I have studied the leucocyte counts on both the cured and fatal cases with a view to determining whether any conclusion as to prognosis could be drawn from the results of a leucocyte count. In six cases, which recovered, we had the following results:

Case I.—Six years of age; observed from the fourth to the eighteenth day of the disease; leucocytes, 16,800 to 24,000. Puncture fluid clear.

Case II.—Twenty months of age; observed from the fifth to the fortieth day; leucocytes 15,000 to 45,000, the latter toward the twenty-first day of the disease. Puncture fluid clear.

Case III.—Four and one-half years of age; observed from the fifteenth to the eighty-fifth day of the disease; leucocytes, 15,000 at the outset, 34,000 at the midperiod, 21,000 in the convalescence. Puncture fluid turbid.

Case IV.—Five months of age; leucocytes 20,000 to 22,000. Puncture fluid clear.

Case V.—One year of age; observed from the fifth to the fiftieth day; leucocytes, 14,000 to 28,000, the latter in the midperiod of the disease; 15,000 toward convalescence. Puncture fluid clear.

Case VI.—Two years of age, admitted on the fourth day of the disease with a leucocyte count of 40,000. Puncture fluid clear.

Taking a like number of fatal cases, we had the following counts:

Case I.—Four months of age; observed from the twelfth to thirty-seventh day of the disease; leucocyte count from 17,600 to 23,200, the low count at the close of the disease. Puncture fluid thick and turbid.

Case II.—Four months of age; observed from the twelfth to the twenty-ninth day of the disease; leucocyte count from 32,600 to 34,000. Puncture fluid cloudy.

Case III.—Six years of age; observed from the

fifth to the fourteenth day of the disease; leucocyte count early of 30,000. Puncture fluid purulent.

Case IV.—Three years of age; observed from the ninth to the eighteenth day; leucocyte count ranging from 34,000 to 55,000. Puncture fluid cloudy.

Case V.—Ten months of age; observed over six weeks; leucocyte count from 10,600 to 26,000, the latter toward the close. Puncture fluid turbid.

Case VI.—Six months of age; observed from the twelfth to the forty-seventh day of the disease; leucocytes, 28,000 to 17,600 early in the disease, and 9,800 to 18,200 later on, the lower count at the close of the disease.

It may be stated that in the so-called basic cases in infants and young children the leucocyte count early in the disease may range from 32,000 to 34,000, but toward the close when the temperature rarely rises above the normal the leucocyte count may fall as low as 9,800 to 10,600. In this respect the leucocyte count resembles what is found in cases of tuberculous meningitis; and these cases on account of this have been mistaken by some for tuberculous meningitis. The leucocyte count in the fatal cases in which the fluid obtained by lumbar puncture is quite turbid, with a sediment resembling pus, is apt to be high, mounting to 35,000 to 55,000. On the other hand, fatal cases with a thick turbid fluid on puncture, may give a count not exceeding 23,200.

Cases which have recovered, showed a leucocyte count of 14,000 to 28,000 during the course of the disease; the leucocytes may have mounted as high as 45,000, as in one case on the twenty-first day of the disease.

It cannot, therefore, be said that a prognosis as to the recovery or fatal issue can be made from the leucocyte count alone without taking into account the duration of the disease and the character of the lesion as revealed by clinical methods of precision.

Characteristics of the Cerebrospinal Fluid Obtained by Lumbar Puncture.—So much has been said of the physical characteristics of the fluid obtained by lumbar puncture in cases of meningitis, either of the epidemic cerebrospinal, the tuberculous, or the suppurative forms, that the writer scarcely deems it proper to repeat what has been said upon this subject. The cytology of the fluids obtained by lumbar puncture in cases of cerebrospinal meningitis is of particular interest as regards the possibility of making a diagnosis from the elements found in the fluid alone, apart from the bacteriology. Of 13 cases studied with reference to the cytology, nine showed a preponderance of polynuclear leucocytes; and four showed mononuclear cells as prevailing elements. It would seem, therefore, that in the majority of cases of cerebrospinal meningitis of the epidemic type, the lumbar fluid presented a polynuclear leucocytic picture. In 15 cases of tuberculous meningitis, studied with a view to noting the character of the cell elements, 14 showed a prevalence of the mononuclear cells, and one case an equal

number of mononuclear and polynuclear cells. In the above studies all the fluids were subjected to careful centrifuge.

It would seem, therefore, that in tuberculous meningitis there is a prevalence of mononuclear cells, and this is so constant that it would seem to us to be characteristic, and verifies what is known from publications on this subject. It will be seen, however, that there are cases of cerebrospinal meningitis of the epidemic type, three of which we have noted, in which there is a cytological picture closely resembling that seen in tuberculous cases. In chronic cases, instead of a predominance of polynuclear cells in the sediment of the fluid obtained by lumbar puncture, the mononuclear picture is apt to present itself, closely resembling what is seen in the tuberculous cases. This is especially true of the chronic cases of cerebrospinal meningitis of the basic type described by Still. Bendix explains this variation from what might be called the normal picture in cerebrospinal meningitis by the fact, proven by Ribbert, that in chronic inflammations lymphocytes abound in the transudates; whereas in acute inflammations, leucocytes abound.

It seems to us that the physical characteristics of the fluid obtained by lumbar puncture aid us but little in coming to a conclusion as to the form of meningitis present. In cerebrospinal meningitis of the epidemic type we have obtained fluid which has been quite clear, with scarcely any sediment, cloudy varying to the purulent fluid; whereas in the tuberculous forms of meningitis, the fluid was clear in 72 per cent. of our cases, but was quite cloudy in others, and more or less cloudy in the remaining number of cases. In all the epidemic cerebrospinal cases which we consider as substantiated either by the clinical picture or the results of lumbar puncture, the *Diplococcus meningitidis* was found at one time or another in the puncture fluid. In one case it was found in two successive punctures, and in a third puncture it was absent and failed to give any culture when spread on media; and in a fourth puncture the diplococcus reappeared. To my mind this simply means that in the fluid obtained in the third puncture, the diplococci were so few in numbers as to elude search conducted with the ordinary care.

The earliest period at which we have found the diplococcus in cases of cerebrospinal meningitis of the epidemic type, was within twenty-four hours after the onset of the disease; and we have established it as late as the fifteenth week of the disease. It is apt to elude search and fail to give any result on media in chronic cases, especially of the posterior basic type.

In this connection, the bacteriology of the fluids obtained from cases of tuberculous meningitis is of interest, and it may be said here that there has been much difference of opinion as to the presence of tubercle bacilli in fluid obtained by lumbar puncture in cases of tuberculous meningitis. Whereas, Lichtheim, Lenhartz and Bernheim found that tubercle bacilli were constant in the sediment of the fluid obtained from tuberculous

meningitis; others, such as Cassell and Marfan have asserted that their presence is only occasional. Our experience in this regard supports the contention of Pfaundler, that the discovery of tubercle bacilli in the fluid obtained by lumbar puncture in tuberculous cases depends much on patience and technic. This is well seen in our own cases. At a time when our technic was imperfect, when we did not centrifuge our fluids carefully, we failed to find the tubercle bacilli. Of late, however, we have made a special study of this question, and during the past year, of 14 cases diagnosed by me clinically as tuberculous meningitis, tubercle bacilli were found in 13 by subsequent lumbar puncture by Dr. E. P. Bernstein, of the pathological staff. To my mind this would prove absolutely that tubercle bacilli can be found by careful search in the puncture fluid of all cases of tuberculous meningitis. In some cases the search must be quite prolonged. In other cases, especially of children brought in late in the disease, we failed to obtain tubercle bacilli in the puncture fluid before death; but they were found to exist in abundant numbers in the fluid obtained by puncture immediately after death. It is hard to account for this apparent inconsistency, but I explain it by the fact that there is during life probably a constant wave of motion in the cerebrospinal fluid, thus securing the equal distribution of the bacilli throughout the cerebrospinal space. As soon as death occurs, this circulatory wave is suspended and a sedimentation occurs and the bacilli are thus obtained in the lower part of the canal.

Mortality.—It need not be said here that in epidemics of cerebrospinal meningitis the mortality among children will vary largely not only with the severity of the epidemic, but with the malignancy of the infection. In some epidemics the malignant cases, that is those which die within twenty-four or forty-eight hours, seem to be more numerous than in other epidemics. Of 37 cases in five years' service previous to the present year which clinically presented all the classical features of cerebrospinal meningitis, 21 were absolutely substantiated either by lumbar puncture or post mortem to be of the epidemic type. Of these 21 cases, the mortality was 42.8 per cent. Of the whole number of 37 cases, the mortality was 35.6 per cent., some were not punctured because the symptoms were self-evident, others were punctured but failed to yield but little fluid, with negative bacteriological results. Most of the fatal cases occurred in infants below one year. Of 15 fatal cases, eight were less than one year of age and two below two years. Thus, the older the child the better its chances of conquering the infection. I have records, however, of cured cases in infants of five months, and one one year of age, in which the diagnosis of cerebrospinal meningitis of the epidemic type was substantiated by cultures from the fluid obtained by lumbar puncture.

Complications.—In the 37 cases of epidemic cerebrospinal meningitis which form the basis of

this paper, we have noticed that the complications were exceedingly few. Those cases that recovered did so with very little to show that the nervous system in any of its extent had been severely compromised. The eyesight was not injured, nor was there in any of the cases, a subsequent hydrocephalus. In other words, the recoveries when they occurred were complete and satisfactory. This is, of course, not due to any modes of treatment employed but to the nature of the cases.

The most common complication seemed to be otitis. Herpes labialis was found in only two cases of the 37 and none of the cases presented joint complications, in this respect differing from the joint complications in the adult. I have lately seen one case of joint involvement. Erythema and evanescent eruptions were observed here and there.

Most peculiar and striking have been several cases of the malignant type which I have seen this year in which death took place within twenty-four hours after the initial symptoms appeared. In both of these cases there was a scarlatinous erythema. This disappeared and was replaced by a purpuric eruption, extensive in character, the skin of the infants and children appearing as if they had been beaten. Ecchymoses were blotchy and of wide extent distributed over the back, thorax, abdomen and upper and lower extremities. The diagnosis in these cases left no question of a doubt, being substantiated by the presence of meningococcus in the fluid obtained by lumbar puncture.

Posterior Basic Meningitis.—Still, of London, has given peculiar interest to this form of meningitis through his investigations of 15 cases of the disease. His clinical summary of the characteristics of these cases is quite classical and may be mentioned here for the sake of completeness: An infant becomes fretful, irritable, peevish, has one or more convulsions, vomits, and then in a few days the mother notices that the head is drawn backward, the limbs are rigid, and there is partial or complete opisthotonos. Quite a percentage of these cases last for weeks and may recover; others pass into the chronic stage, which may last for months, with complicating hydrocephalus. During the course of the disease, the rigidity of the neck, the retraction of the head, becomes extreme, and finally the infant passes into a condition resembling a tetanic state, with its arched back, its retracted occiput, the upper extremities in the position of extension, the hands clenched, very much as is seen in forms of tetany. The lower extremities remain in a condition of rigidity and of extension, and the feet and toes both extended. It was formerly thought that these cases were tuberculous; but Still has found that in 13 of his 15 cases he could isolate a diplococcus which to-day may be considered identical with the *Diplococcus meningitidis*. Still and Nuttall both consider this form of meningitis a type of sporadic spinal meningitis, with the same etiology as that of the epidemic cases. Any one who has much to do with infants and children has

seen these cases, and I have seen quite a number of them.

These cases have come to me in the hospital in the subacute stage, and, as is very often the case, I have had no opportunity until recently to make a post mortem in a case of basic meningitis. In one case the fluid withdrawn by lumbar puncture was quite clear, resembling that of hydrocephalus. The fontanelle was bulging to a considerable extent, being open, and we drew off considerable fluid by repeated lumbar puncture. We have been unable, however, to cultivate the *Diplococcus meningitidis* from this fluid. The cytology in this case to which I refer showed a preponderance of mononuclear lymphocytes. In none of the cases have we been able to prove the tuberculous nature of the disease by the injection of cerebrospinal fluid into animals, and this I am inclined to believe would support the contention of Still that this type of cases is distinctly caused by the *Diplococcus meningitidis* and is to be classed with the epidemic cases.

I have recently been fortunate in obtaining a post mortem on a case of posterior basic meningitis in the puncture fluid of which I obtained the *Diplococcus intracellularis* both by cover glass stain and culture. The history of the case is as follows:

Female child, aged two years, with a negative family history. The child had been born normally, had not suffered from any infectious disease; although a year previous had an abscess in the neck, which was cured in three weeks. No history of ear trouble; has always been a healthy, bright child.

Present History.—The illness was of five weeks' duration, began suddenly with fever and general convulsions; since then the child has felt better at times, and at other times, chiefly toward evening, the symptoms have reappeared. The child became stuporous since yesterday. The father thinks it is blind; it has vomited occasionally for the past three days. There have been sudden movements of the upper and lower extremities. During this illness the child has become much emaciated. There is no cough. The bowels and urination are normal. No previous history of traumatism. The father has not noticed any enlargement of the child's head during the illness.

Present Status.—The child lies with its head retracted and body slightly curved, the concavity somewhat to the left. There are occasional purposeless movements of all the four extremities, more marked on the right side. These are sometimes so limited as really to constitute tremors. The child starts at the least sound. Is unconscious. The eyes are open, pupils dilated, though they react to light. The forearms are extended from the arms, the hands clenched; the lower extremities are extended, the feet extended, as also the toes are flexed into the plantar surface of the foot. At times the child is rigid. There is rigidity at the back of the neck, and this rigidity is increased if the child is handled. At such times,

there is extreme opisthotonos, the head is drawn back at an angle to the trunk. In other words, there is a spastic condition of all the extremities. The knee-jerks are increased; there is no clonus. The spasm at times is extreme, and a good deal of force is necessary to move the hands or legs. There is a tâche cérébrale. The respirations are very irregular, sometimes superficial and at others deep. There is no paralysis either of the muscles of the face or those of the orbit of the eyes. The ears are negative; heart and lungs show nothing peculiar. The liver normal to percussion; spleen palpable just below the free border of the ribs. Abdomen retracted. The skin shows a slight erythematous rash on the trunk. The throat cannot be examined on account of the fixity of the lower jaw (trismus).

The further history of the case is uneventful. The temperature was normal on admission, rose toward the close to 101° F. The pulse ranged from 100 to 140, being quite irregular at times. The respirations ranged from 28 to 48. Toward the close, the opisthotonos retraction of the head and rigidity became very marked. The child presented all the features that are characteristic of basic meningitis. The lumbar puncture was made in this case two days before the fatal issue, the child dying four days after admission to the hospital. A flocculent fluid was obtained which showed the presence of 73 per cent. polynuclear leucocytes, and 27 per cent. mononuclear lymphocytes. The spreads and culture of the puncture fluid showed the *Diplococcus intracellularis*, negative to Gram. There was no sugar in the fluid. The child died suddenly in the afternoon of the fifth day after admission. A post mortem was obtained on the brain alone, and showed a classical basic meningitis, as described by Still. The convexity showed only slight meningitis; congestion was marked and there were areas of opaque tissue in the pia or old organized foci of inflammation.

In the post mortems made by Still, he found as an accidental complication recent or old tubercles in a few cases; but in these very cases he has been unable to find any tubercles of the brain or cord. On the contrary, he has established a diplococcus in the ventricular fluid, and therefore considers the tubercles as an accidental complication and not a primary cause of the disease.

Treatment.—The more we study the methods of treatment pursued in the management of cerebrospinal meningitis, the more we are led to the conclusion that the disease, very much like pneumonia, is a self-limited one, and that all we can do is to relieve the suffering of the patient and treat the complications. The results of treatment seem to be very closely connected with the severity of the epidemic, and that of the infection in the various epidemics. Thus, in an epidemic in Oporto there is a record of 56 deaths in 91 cases, a mortality of 62 per cent. In other epidemics, the mortality has been quite low, 25 per cent., and in others higher than this percentage, as may be seen by referring to the section on mortality.

And still in these epidemics very much the same treatment has been pursued, if we except one procedure, viz., that of lumbar puncture.

Much has been expected of lumbar puncture, and still, it must be said, comparatively little has been realized from it, in a therapeutic sense. Seager, in recording the mortality and treatment observed by him in cases of epidemic cerebrospinal meningitis, shows that by simple lumbar puncture 9 cases in 20 died, a mortality of 45 per cent. In the treatment by baths, 60 per cent. died. He then gives the statistics of the latest procedure, that of lumbar puncture, followed by the injection of a number of c.c. of a one-per-cent. solution of lysol: Of 31 cases treated by such an injection into the cerebrospinal space, 13 died, a mortality of 42 per cent. In the same clinic where Seager observed these procedures, seven cases were treated with an injection of oxycyanide of mercury, and four died. Neither of these procedures prevented relapses in the cases observed by Seager, and these were quite frequent. In the epidemic in Oporto, 26 cases were treated by simple lumbar puncture. Of these, eight died, a mortality of 30 per cent.

In considering the benefits of lumbar puncture in an epidemic of cerebrospinal meningitis, there are some, such as Osler, Wentworth, Concetti, Travers Smith and others, who think that this procedure is of decided benefit to the patient, inasmuch as headache and delirium are often relieved.

My own experience, and this is considerable, teaches me that we cannot say as yet that lumbar puncture is curative. Indeed, it cannot prevent relapses, as I have proven to my own satisfaction in cases in which the temperature had dropped after lumbar puncture, remained normal for a week, and then, without any apparent cause, a new attack was inaugurated. The fluid after the last puncture having been quite clear and sterile, possibly on account of the paucity of microorganisms, became very turbid again and there recurred an intermittent curve, lasting over three weeks. I have seen the temperature rise after lumbar puncture, and the patient on the surface did not seem to have been benefited; but on a close study of the cases, I have found that the temperature is not a guide as to the efficacy of the procedure of lumbar puncture. Lumbar puncture certainly relieves symptoms of pressure, for in older children who can describe their sensations, there is much relief after the withdrawal of 40 or 50 c.c. of fluid from the cerebrospinal canal. In fact, in one case, I remember distinctly a little patient of twelve years who actually requested (so severe was the headache) that the procedure should be repeated, inasmuch as it was the only thing that gave her relief. Therefore, if the irritability is great and headache is severe, as may be judged even in children by the rational symptoms, lumbar puncture is indicated.

Again, if rigors are frequent, lumbar puncture is certainly indicated inasmuch as a certain amount of purulent exudate is thus withdrawn

in the same sense as it would be indicated in a pleurisy.

Lumbar puncture is inefficient in certain types of cases in which there is extreme retraction of the occiput, rigidity and even opisthotonos (basic meningitis). In some of these cases, introduction of a needle it attended by no results; that is, there is a dry tap. It has been shown that in these cases there is danger of sudden dilatation of the ventricle, and what might have been relieved by the only procedure known in medicine, lumbar puncture, fails in the very cases in which it is most needed.

Again, lumbar puncture gives us a very good idea, in a prognostic sense of the future fate of some cases. Where the cerebrospinal fluid is thick and purulent, and flows slowly from the canula, the prognosis is grave. I have not succeeded in saving any of these cases. Particularly encouraging are the cases in which the fluid obtained by lumbar puncture is of a cloudy appearance, at most showing a straw color.

In a procedure in which so little is known as to its efficacy, it is quite to be expected that all sorts of modifications should have been suggested. I refer to the injection of chemicals or antiseptic fluid, such as lysol and the oxycyanide of mercury. To my mind, none of these procedures has lessened the mortality.

Our treatment has consisted simply of a lumbar puncture whenever indicated by high temperature, continued excessive irritability of the patient, stupor, constant headache, and delirium or rigors. Following out this method, we have felt that we had at our disposal a very excellent method, not only of relieving these symptoms, but of relieving pressure on the vital organs; the brain and cord, at the same time withdrawing from the cerebrospinal space a certain amount of purulent fluid. In view of the fact that the bacterial life of the meningococcus seems to be a self-limited one, I doubt very much whether the procedure of lumbar puncture has a direct influence in shortening the disease. In younger infants and children, however, I do think that repeated lumbar puncture might aid materially in preventing certain complications, such as hydrocephalus following cerebrospinal meningitis, which, as you all know, is a very serious consequence with which to be confronted. Therefore by relieving the pressure, we may possibly prevent in these young subjects a tendency which is present to dilatation of the ventricles and the accumulation of fluid therein.

Our experience with lumbar puncture has been quite extensive. We have never had an accident which could be attributed directly or indirectly to the procedure. Our method of performing lumbar puncture has followed closely that advised by Quincke. If we were unsuccessful and obtained what is known as a dry tap, we have repeated the puncture in another space, but we have not gone further than this. In several cases the primary puncture was followed by quite a profuse hemorrhage. Quincke thinks that this hemorrhage can be traced to the puncture veins in the subdural

space. In none of the cases in which hemorrhage occurred have we seen any ill effects follow. In fact, the cases in which hemorrhage occurred made a good recovery without paralysis, especially of the lower extremities.

A peculiar symptom, which I have not noted elsewhere, is that of a desire to urinate at the time of the entry of the trocar in the cerebrospinal space. This, however, is only momentary, and disappears as soon as the trocar is withdrawn.

As to the number of times which a case should be punctured, there is, of course, no set rule. If the temperature remains down after a puncture, and the irritability and headache are not very marked, it is well to hold our hand. If, however, there is a subsequent rise of temperature we may puncture, though certainly not more often than at intervals of four or five days.

As to the quantity of fluid withdrawn in every case, this will vary. In some cases the fluid flows very rapidly from the canula; is quite clear, or slightly turbid, and in a very short space of time 70 or 80 c.c. are withdrawn before there seems to be a relief of tension, which is judged principally by the rapidity with which the fluid flows from the canula. If the fluid flows slowly, drop by drop, we rarely withdraw more than 30 c.c. at a sitting.

Our further treatment, as published elsewhere, has consisted of hot baths for the rigors; sponging, for the temperature; the intestinal canal was kept open with calomel, and we have administered in all of our cases iodide of potassium and sodium in full doses.

I have never made a so-called cervical puncture; nor do I think that lumbar puncture can be ranked with aspiration of the chest as an emergency procedure. Thus, given a case of cerebrospinal meningitis with a very high pulse, such as has occurred in my practice lately of 200, a condition of coma, and all the symptoms of malignant cerebrospinal meningitis, lumbar puncture has seemed of little avail, as practised to-day.

In conclusion I wish to express my thanks and appreciation to my former assistant at the hospital, Dr. C. F. Jellinghaus, who carefully compiled the statistics of this work.

A PLEA FOR THE ORGANIZATION OF A "SOCIETY OF SANITARY AND MORAL PROPHYLAXIS."

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It is proposed to form in this country a *Society of Sanitary and Moral Prophylaxis*, the object of which is the study of the means of every order—sanitary, moral and legislative—(the legalization of prostitution excepted) which promise to be most effective in preventing or diminishing the spread of diseases which have their origin in the Social evil. This Society is to be composed of medical men, representatives of the clergy, of the law—public educators, sociologists and public-

spirited men generally—similar to societies which have been organized in various cities and countries of Europe.

At first glance it might appear that the prophylaxis of these diseases, as of other infectious diseases, dangerous to the public health, lies exclusively within the province of the medical profession. But experience has shown that this class of diseases cannot be dealt with as a purely sanitary problem, they are not susceptible to the application of the sanitary methods ordinarily employed against contagious diseases. Sanitary science must take cognizance of the cause of disease and especially of the means by which it is spread. The cause of these diseases resides in social conditions which the sanitarian cannot control and their communicative mode cannot be reached by the strong arm of repression.

In their essential nature they are not merely diseases of the human body, but diseases of the social organism. The problem of their prevention or control involves not only questions of hygiene, but questions of morality—questions affecting the most intimate relations of our social life. This problem is most difficult and delicate and requires for its solution not only a thorough knowledge of existing evil conditions, but a largeness of ideas and a breadth of view which is not possible to those who look at it from the sanitary side alone. To correct these evil conditions there should be a union of all the social forces which work for good in the community.

THE NEED OF SUCH A SOCIETY.

That there is a need, and a most urgent need, for such an organization is abundantly evident from a consideration of the following facts:

It is now generally recognized that the class of diseases comprehended under the general term *venereal*, together with alcohol and tuberculosis, constitute the three great modern plagues which afflict humanity. Tuberculosis has been subjected to sanitary control, leagues have been formed against alcohol, and legislative aid has been sought through high-license and other restrictive measures to limit its evil influence, but the venereal plague is practically ignored and, in this country at least, its ravages are unchecked and apparently unnoticed.

THE MAGNITUDE OF THE VENEREAL PERIL.

The significance of syphilis as a social danger has long been appreciated by the medical profession. Years ago Prof. Gross declared that "a greater scourge than yellow fever, and cholera and smallpox combined is quietly installed in our midst, sapping the foundations of society, poisoning the sources of life, rendering existence miserable, and deteriorating the whole human family." According to Sir Thomas Watson, "it counts its victims not only in the ranks of the vicious and self-indulgent, but among virtuous women and innocent children by hundreds and thousands." When this was written, less than a generation ago, it was not known, even by the

medical profession, that under the guise of what was considered a simple local disease of the urethra there lurked an infection which, in respect to the character and sum total of its dangers, is a greater curse to the human family than syphilis. Modern science has shown us that gonorrhea, which is regarded by the bearer as of no more significance than a common cold, which is treated as a joke or with the contempt of ignorance, is the greatest social pest of the age.

EXTENSIVE PREVALENCE.

Since these diseases are not subject to official registration the amount of venereal morbidity in this country does not admit of mathematical expression. In Europe it has been estimated by a distinguished authority that fully 75 per cent. of the adult male population contract gonorrhea, and that from 10 to 15 per cent. have syphilis. Assuming that we are a more virtuous people than those of Europe, it would be a most conservative estimate to say that the morbidity from both these diseases would represent 60 per cent. of the adult male population. Venereal morbidity is larger in urban than in rural populations, but everywhere its incidence falls most heavily upon the young.

It is a fact worthy of consideration that every year in this country 770,000 males reach the age of early maturity—that is, they approach the danger zone of initial debauch. It may be affirmed that under existing conditions at least 60 per cent., or over 450,000, of these young men will become infected with venereal disease—infallibly infected—if the experience of the past is to be accepted as a correct criterion of the future. Twenty per cent. of these young men will become infected before their twenty-first year, over 60 per cent. before their twenty-fifth year, and more than 80 per cent. before they pass their thirtieth year. This computation is not based upon loose conjecture, but upon carefully compiled statistical evidence. No allowance need be made for the incidence of mortality, since this is more than compensated for by the influx of young immigrants. The census of 1900 gives over 787,000 males thirty years of age.

These 450,000 infections, be it understood, represent the venereal morbidity incident to the male product of a single year; each succeeding group of males who pass the sixteenth year furnishes its quota of victims, so that the total morbidity from this constantly cumulative growth forms an immense aggregate.

The pathological importance of these diseases is to be measured not only by their effects upon the individual, but upon the family and the race.

EFFECTS UPON THE INDIVIDUAL.

The large proportion of individuals infected by venereal disease get well, some of them die, many of them suffer for years or during their entire life from its consequences.

Syphilis is a far more serious disease than was formerly supposed. Every year adds to our

knowledge of the number, variety, and gravity of its far-reaching complications and especially its morbid determinations to the internal organs most essential to life. Many affections of the brain, the cord, the liver, the heart, and the arterial system have their origin in syphilis. Of all the internal organs the brain is the most frequently affected by syphilis, and paresis is the most common termination. While syphilis, in the adult, is not a frequent cause of immediate death, the changes set up in certain organs or systems of organs are often the essential cause of death at a more or less remote period. Syphilis kills people to-day as it did in the 16th century.

Gonorrhea is an infection which, in addition to its local inflammatory complications, which often render the individual sterile, is capable of causing constitutional complications of a serious or even fatal character—such as deforming and incurable inflammations of the joints, pericarditis, meningitis, peritonitis, etc. The undeniable and scientifically demonstrated danger of gonorrhea is especially manifest in its serious effects upon the pelvic organs of women. It is the most common cause of inflammatory affections peculiar to women, which ruin her health, extinguish her conceptional capacity, and condemn her to a life-long invalidism or the sacrifice of her reproductive organs to save her life.

The chief significance of these diseases as a social danger arises from the fact that they specifically affect the organs of generation—they damage or destroy the functions through which life is perpetuated, and thus defeat the social aim of marriage.

EFFECTS UPON THE FAMILY.

Pinard found that in 10,000 consecutive cases of miscarriages or abortions, 42 per cent. were caused by syphilis; the remaining 58 per cent. due to all other causes combined, artificial or otherwise. The destructive effect of syphilis upon the offspring is still further manifest in children stillborn at full term or who die shortly after birth. The mortality from hereditary syphilis ranges from 60 to 86 per cent., while those who survive are affected with various organic defects and degenerative changes which unfit them for the battle of life. If they reach maturity and marry they may transmit to their descendants—the third generation,—the same class of organic defects which they have inherited.

It has been computed that at the very lowest estimate, hereditary syphilis kills every year in France alone, 20,000 children, which represents 7½ per cent. of the mortality from all causes combined. It may be said that it is better that these children should die than survive as a race of inferior beings; it is to be remembered, however, that but for the fact of syphilis in the parents these children might have been born in conditions of vitality and physical vigor.

Gonorrhea is an even more potent factor of depopulation than syphilis, from its greater prevalence and more frequent introduction into mar-

ried life and its inhibitory influence upon the conceptional capacity. It is computed that 50 per cent. of gonorrheal women are absolutely sterile, and that gonorrheally infected men are responsible for 20 per cent. of sterile marriages, when the sterility is not of choice, but of incapacity.

While gonorrhea is insusceptible of hereditary transmission, the child born of an infected mother is exposed to inoculation of the eyes with the virus resulting in the terrible affliction of blindness. Eighty per cent. of the blindness of the newborn is caused by gonorrhea, while it is computed that from 20 to 30 per cent. of blindness from all causes is due to gonorrhea.

FREQUENCY OF MARITAL CONTAMINATION.

The amount of venereal morbidity in married life is an unknown and unknowable quantity. Thousands of married women are infected without knowing or even suspecting the name or nature of the disease. The insidious character of the infection, especially of gonorrhea, favors dissimulation, and when known, every motive—pride, self-respect, shame—prompts to its concealment. It may be a startling statement, but nevertheless true, that there is more venereal infection among virtuous wives than among professional prostitutes in this country. Noeggerath stated that of every thousand men married in New York 800 had latent gonorrhea from which their wives became infected. Admit that this is an exaggeration—a gross exaggeration, even—say 8 per cent. instead of 80 per cent.; of the 16,000,000 married women in this country 8 per cent. would give over one and a quarter million infected from gonorrhea alone.

Unfortunately, the diseases of vice when transplanted to the bed of virtue develop their worst effects. The function of marriage is to create life, and in fulfilling this function the individual danger of the disease, especially of gonorrhea, is greatly accentuated. Pregnancy often transforms a latent and hitherto inoffensive gonorrhea into an intensely virulent infection, and the process of parturition opens the way to its upward ascension to a vital organ—the peritoneum—with results dangerous to life.

We are accustomed to recommend marriage to young men as the surest preservative against venereal infection. Can we with a clear conscience recommend to young women marriage with men who have led dissipated lives? Surely there is something rotten in a social system which places no restriction upon that individual liberty which permits men to poison their wives with venereal disease—which throws no sanitary safeguard around that relation which society has instituted for its own perpetuation. Certainly there can be no severer arraignment of that false system of education which directly fosters, and even renders compulsory, the ignorance which is largely responsible for these social crimes.

It cannot be gainsaid that the vast majority of infections in married life are effected through

ignorance—the opinion of all physicians who have had much to do with this class of cases is concurrent upon this point. The average man is not a criminal—he does not wreck the life and health of his wife and children knowingly and wilfully. In most cases he does it through ignorance of the nature and terrible consequences of his disease—ignorance of the prolonged duration of its contagious activity and, especially, ignorance of the fact that it is often infectious after apparent cure.

REMEDIAL MEASURES.

The cardinal principles of prophylaxis are, (1) To preserve the healthy from infection; (2) To prevent those already infected from infecting others.

It is the consensus of opinion among those who have studied this subject that a general diffusion of knowledge respecting the dangers, individual and social, of venereal diseases, their modes of communication, direct and indirect, would constitute the most efficient means of prophylaxis. This knowledge would be of inestimable benefit to the young in preventing ignorant and reckless exposure to dangers which many of them do not even know exist. Of the 4,000,000 or more of males in this country, between the ages of sixteen and twenty-one years, how many have received even the most elementary instruction in the physiology of the organs of generation? These young men are launched into the world without any knowledge of the hygiene of the sexual function or the dangers which attend its irregular exercise. They have been taught nothing of the diseases which are almost inseparable from commerce with bad women, or of the serious consequences to their health which those diseases may entail. It is believed by medical men who are most competent to judge these questions that ignorance is responsible for a large proportion of infections among the young, and that education would preserve thousands from exposure.

To whom this education should be addressed—what should be its scope or extent, and how, or through what agencies, it should be imparted—are subjects for consideration by the proposed Society. As regards the latter point, it might be assumed that this enlightenment should come through the agency of the medical profession. But the physician's opportunities for this educational work are comparatively restricted. He rarely comes in contact with the young man except in his capacity as a patient, after the harm is already done. So far as concerns the vast army of the working class and the poor who are treated by public charity, he practically never sees them except in the crowded classes of the dispensaries. The mode of this education cannot be individual, it must be collective and conveyed through means of lectures, conferences, tracts, or circulars. The physician cannot organize popular lectures; he may write papers exposing the dangers of venereal diseases, but they never reach the general public.

The proposed Society should be a centre for the diffusion of this enlightenment; it should be an influential force in effecting a reform in an educational system which now neglects all instruction in the hygiene of one of the most important functions of the body; it should propagate the idea that this hygienic education forms the most essential part of the training of the morals of young men.

Whatever may be the value of education as a preservative against exposure to infection, it will certainly constitute a valuable prophylactic measure against the introduction of these infections into marriage. Medical men now look upon certain marriages as moral crimes. When the plea of ignorance can no longer be invoked to shield those who carry disease and death into their families they should be declared legal crimes, involving not only civil but penal responsibility.

In fulfilling the second indication, the most valuable prophylactic measure is the prompt sterilization of sources of contagion by efficient treatment. The object is to cure as many as possible of those infected in order to sterilize the greatest number of foci. To accomplish this object the treatment should be gratuitous and available to all—not so much in the interest of the individual as in the interest of others he might expose to infection. Without entering fully into this subject, it may be said that the provisions for the treatment of this class of sufferers are notoriously inadequate, restrictive, and not adapted to the nature of the disease. Venereal patients are debarred entrance into our general hospitals, and discriminated against in various ways.

One or two gross abuses growing out of the insufficient hospital accommodations in this city may be briefly referred to. Of the thousands of respectable married women in this city infected with syphilis by their husbands some require hospital care; they can be received only in the female venereal ward of the City Hospital; they are compelled to inhabit the same room, sleep in beds side by side with the lowest and most abandoned prostitutes. It sometimes happens that a young girl who has taken only the first step in the downward path, and who, in being robbed of her virtue has lost her health, is compelled to go to the hospital; she is subjected to the close companionship and demoralizing influence of women old in vice, who are adepts in the arts of proxenetism. This is not the worst; young girls under fifteen years of age who come under the care of the "Society for the Prevention of Cruelty to Children," when found diseased, usually from criminal assault, are placed in this same ward and detained until they are pronounced cured. A female venereal ward has been termed "*un bouillon de culture pour la prostitution*." This society is not to blame for this practical perversion of the object for which it was founded, since the city affords absolutely no other provision for the treatment of these cases.

There are many social conditions which favor

the spread of these diseases—many of them requiring for their correction the intervention of the Administrative authorities, which would properly come within the scope of the Society's work. They are many-sided questions, and require many-sided minds to deal with them wisely and effectively.

ATTITUDE OF SOCIETY.

In the presence of this peril which so seriously menaces the public health and is fraught with such momentous consequences to the family and the race, the social forces are apathetic and inactive. Society does not seek to deliver itself from this evil, its only preoccupation is to cover up and conceal, to shut its eyes to its existence. From the mistaken idea that these diseases are always contracted through voluntary exposure and bear the stamp of immorality, their victims are without the pale of public sympathy or public protection. The public does not know that the immense majority of infections occur in the young, the inexperienced, and the irresponsible through ignorance and lack of moral training; it has no conception of the number of innocent women and children who are infected in the marriage relation.

It will be seen, then, that the diseases which it is the object of this association to prevent are preeminently Social Diseases—they affect the dearest interests of society, they enter into the most sacred relations of human life, they seriously menace the welfare of the family and the future of the race, they constitute a social danger of the greatest magnitude. They are diseases from which society suffers, and yet society views them with indifference, while the medical profession regards them with the deepest concern, and seeks to limit their spread. But the medical profession recognizes its inability to cope successfully with conditions which lie entirely without the sphere of sanitary influence or control.

We ask members of the laity—whose position in the community commands respect, whose opinions carry weight, who can influence public sentiment, institute educational reforms and secure needed legislation—to cooperate with the medical profession in forming a league against this Social Peril. This movement, which has for its chief objects the preservation of the youth of this country from ignorant exposure to infection and the safeguarding of marriage from the desecration of loathsome and dangerous diseases, appeals to that humanitarian instinct which prompts protection to the irresponsible ignorant, as well as the innocent and helpless members of society.

66 West Fortieth Street.

City Hospital for Homeopaths.—A bill has been introduced into Councils providing that a site at Twentieth street and Lehigh avenue be set aside for a department of the Philadelphia Hospital to be conducted by the homeopathic school. Action on the bill cannot be taken until after the summer recess.

THE MANAGEMENT OF OCCIPITOPOSTERIOR POSITIONS OF THE VERTEX.

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My object in selecting this title for a paper is not to add anything new to what is already known of occipitoposterior positions, but to corroborate and emphasize many of the recent statements made for their management from the standpoint of hospital and private practice.

In the first place there is a great discrepancy in the frequency with which these positions are encountered by various observers. Most writers estimate 70-75 per cent. of all vertex cases as primarily L.O.A., 20 per cent. R.O.P., 4 per cent. R.O.A., and only 1 per cent. L.O.P. I do not believe that these figures are correct. Before we can obtain their relative frequency we must be positive of the position of the head at the beginning of labor, as one who examines only during the second stage will class many cases anterior which started originally as posterior positions. The hospital statistics, which I have collected, show that primary posterior positions occur in about the proportion given above. Taking at random a thousand vertex cases from the records of the Sloane Maternity Hospital, I found 194, or a little less than twenty per cent. designated as primary occipitoposterior positions, but, as over one-half of the thousand cases were admitted in labor, the percentage should, in reality, be much higher. Again 341 cases were indexed as L.O.T. or R.O.T. positions. A great many of these probably also started as posterior positions, but had not completely rotated, so that these hospital figures are far from being correct. Right here I might state, on the other hand, that we should add both of these positions (L.O.T. and R.O.T.) to the four ordinarily given, for undoubtedly a goodly number of vertex cases start in this manner, not only where there is a relative flattening of the brim of pelvis, but also where the pelvis is normal or even justo-major in dimensions.

Another fact especially brought out in these hospital statistics is the relative frequency of right and left posterior positions. The ratio is given in text-books as 20 to 1, but in this series of 1,000 cases it is found to be 109 to 85, or almost equal in number.

Probably from one's own private practice, where cases are more carefully watched and a diagnosis of position is usually made shortly before and always at the beginning of labor, can we get at the true figures. The only difficulty is obtaining a large enough series from which to make general deductions. In the first 100 vertex cases, occurring in my private practice, I have recorded 27 (27 per cent.) R.O.P. and seven (7 per cent.) L.O.P. positions, showing that the latter occurred less frequently than at the Sloane Hospital, but I also recorded 15 cases (or 15 per cent.) starting as L.O.T. and only six (or 6 per

cent.) as R.O.T., and it is more than likely that some of the former started posteriorly.

Whatever the value of these figures, they show at least that we should regard L.O.T. and R.O.T. as primary positions of the vertex, and that left occipitoposterior positions occur more frequently than is ordinarily imagined.

The diagnosis of these positions can readily be made. If in last two weeks of pregnancy the head has not entered the pelvic inlet, or does not even dip therein, we should suspect that the occiput is posterior, even without carefully examining for an exact position. Yet this riding high of the head, of course, may be caused by a disproportion between the size of the head and the size of the brim of the pelvis. My experience has taught me that only an excessive amount of abdominal fat or liquor amnii will render unreliable the signs obtained before labor by abdominal palpation and auscultation. Vaginal examination will clinch the abdominal diagnosis, provided the cervix is sufficiently dilated to permit one to feel the sutures and fontanelles.

At the time of labor, when the pains occur at short intervals, or the uterus is tightly contracted about the child, abdominal examination may fail to give positive results. In such cases the vaginal examination alone must be relied upon.

There are certain men who claim that enough can be obtained from the abdominal signs and the frequency and character of the labor pains to make vaginal examinations unnecessary, as they fear the possibility of infection. Although admitting that indiscriminate and frequent vaginal examinations are to be condemned, I believe that many of us are not satisfied as to the position, the flexion of the head, its descent, the degree of molding, and the consistency and dilation of the cervix unless a vaginal examination is made not only early in labor, but also later, when occasion arises. Even then one is not always sure of the state of affairs. Take, for example, cases where there is a very thick caput succedaneum, an accessory suture, a Wormian bone, or a false fontanelle just in front of the posterior fontanelle. Under such conditions, we are often not only justified but compelled to do more than to make a simple vaginal examination. We must carry the hand into the vagina and up into the uterus before we can make a positive diagnosis preparatory to instituting the correct measures to facilitate or to terminate a protracted labor.

As prophylactic measures in the management of occipitoposterior cases, postural treatment and external manipulations either before or at the beginning of labor can be tried, but how much success will be achieved by these methods is very uncertain. Nevertheless, we ought to take advantage of them, for nature often only needs the slightest aid to work wonders. The correction of the malposition may be aided by keeping the patient on her feet by moderate out-of-door walks before labor and about the room during the first stage of labor. I also believe that small doses of quinine and strychnine, either used singly or

in combination, for one to three weeks before labor, or during the first stage, may act as auxiliaries by strengthening the pains.

Before anyone undertakes the operative delivery of an occipitoposterior position, he should make himself thoroughly familiar with the normal mechanism. He should not be alarmed simply because he has such a position to deal with, since a large percentage, some observers say as high as 90 per cent. rotate anteriorly spontaneously.

In order that this anterior rotation may occur a number of conditions must be fulfilled: (a) The head must not be too large for the pelvis, nor the pelvis too small for the head; (b) the flexion must be good; (c) the pelvic floor must be resistant; (d) the uterine contractions must be strong.

I believe that a lack of this last condition is probably the most frequent cause for interference. The age of primiparity to-day is raised to a high average (thirty years or thereabouts), the high nervous tension of our city woman with her "hot-house" bringing up, and her inability to endure pain, together with the lack of self-control under it, demanding the early administration of chloroform, all tend to lessen our principal force—that of expulsion. The uterine contractions have a great deal to do in a posterior position. The head must be often molded into and through the brim, must be flexed, must be forced down to the pelvic floor, must be rotated through three-eighths of a circle; must be remolded through the outlet, and finally forced over the perineum. If the contractions are weak and inefficient these steps may not occur, and the accoucheur may be compelled to step in at any time.

Let us take the cases when we are called upon to assist either for the sake of the mother or child.

1. *An Occipitoposterior Position Above the Pelvic Brim.*—Before going into details as to the management of these cases, I wish to issue a warning against too early interference. I have seen many cases brought into the Sloane Hospital where forceps had been tried outside and failed, but where, a little more time having elapsed, as in transit in the ambulance, the head has engaged or descended well into the pelvis or rotated, so that labor has terminated spontaneously or with but slight assistance.

If the head is movable and high, the accoucheur must duly weigh all the conditions before he decides what to do. The plan of treatment which I would recommend when the pelvis is normal is as follows: Get first as complete a dilatation of the cervix as possible, then under deep anesthesia carry the hand into the uterus and manually rotate the occiput anterior. This can often be accomplished if the lower uterine zone is not retracted about the child. Then holding the head in position by the hand inside the uterus, and aided by an assistant making strong pressure on the fundus, apply the forceps to the sides of the head.

Often this anterior rotation will be brought

about in another way. By introducing both of the blades of the forceps posteriorly, one over the other, and in rotating them for a pelvic application, the head will rotate also, and the application will be cephalic as well. Rotation of the head by means of the forceps above the brim using force, however, is fraught with great danger to the mother and most often results in failure.

If, after rotating the head, and using moderate traction with the forceps, the head does not descend, or if the pelvis is found to be flattened, version would probably be the better operation, safer for both mother and child.

The cases which are the most trying are those where there has been a dry labor and the lower uterine segment is tightly contracted about the head. Here manual rotation is impossible and version absolutely contraindicated for fear of rupturing the uterus. These cases demand a patient and prolonged effort with the forceps, carefully watching the condition of the child. What must we do? We must drag the head through the brim and down to the pelvic floor in its posterior position before nature will help us, or before we can assist the rotation. The blades do not fit the head, the hold is insecure, and no matter what kind of a forceps is used there is a tendency to slip, especially when a fair amount of force is employed. One blade, if the position is R.O.P., holds only by the tip against the right side of the forehead, and the other blade grasps the left side of the occiput by its anterior edge. Consequently, to prevent this slipping, one must of necessity crowd the blades together, and so unduly compress the head. Again, even if we use axis traction forceps, there is considerable resistance on the part of the symphysis, the part of the head in front of the coronal suture impinging against it, and it necessarily follows that, when great force is required, this soft part of the skull is pushed up and intracranial lesions may result, so that the child is often born dead or dies in a few days. A symphyseotomy, or better, a Cesarean section, would be the only method of getting it out alive in such cases, but we are unwilling at the outset to propose this operation without giving forceps a trial. Then it is too late. In some of the cases in which the child dies in attempting forceps, or is in *extremis* when we are called upon to deliver, craniotomy will become necessary.

2. The second group includes those cases where the head is engaged in the superior strait or is in the midpelvis. Sometimes the manipulation of pushing up the forehead and thereby increasing the flexion will allow the occiput to come down low enough during a pain to meet the resistance of the pelvic floor, and so start the rotation in this class.

When, however, the forceps is indicated, often under complete anesthesia, if the head is not wedged into the pelvis, in introducing both blades posteriorly the head will rise above the brim and, upon applying the blades, it will rotate with them, so that the posterior position is at once overcome and the forceps grasps the head cephalically. If

the head is practically impacted in the pelvis, the blades must be applied to the sides of the pelvis. Usually, as the occiput strikes the pelvic floor, it rotates anteriorly spontaneously, or we can assist the rotation with the forceps by readjusting the blades from time to time with each advance until the occiput is anterior. This is especially the case when solid blades are used. There are a few cases, however, in which rotation will have to be effected as described in the next class.

3. This class includes the largest proportion of cases where the head is at the pelvic outlet with occipitoposterior. We ought not to think simply because of this abnormal position that all cases should at once be corrected. The great majority rotate spontaneously. Many others can be allowed to come through with the occiput behind, for although the prognosis for the child is supposedly worse and a larger anteroposterior diameter of the head comes over the perineum, serious damage is very rarely done. To illustrate, out of 104 persistent occipitoposterior positions in 5,000 deliveries at the Sloane Maternity Hospital, 55 were allowed to be born with the occiput behind, and only in four cases was the perineum slightly torn. Nine of these happened to be primiparæ, with fairly firm perineal bodies. Not that I recommend this to be the usual treatment in private practice. I simply wish to show that the outlook is not so bad after all when anterior rotation fails to occur.

Many cases can be manually turned with ease. Twenty-seven out of the remaining 44 cases in the above series were successfully treated in this way, although in four uterine inertia made the application of forceps necessary after anterior rotation had been effected.

How, then, shall we use the forceps when necessary?

In four ways: (a) Most cases will rotate while the blades, having been first introduced posteriorly one over the other, are being rotated for a pelvic or cephalic application as if the head were in an L.O.A. or an R.O.A. position. (b) Others can be rotated, using the first blades as a vectis, the left blade in an L.O.P. position, and the right blade in an R.O.P. position. Then introducing the second blade laterally for a cephalic application, one can hold the occiput in front and deliver in the usual way. This same method will apply to L.O.T. or R.O.T. cases—that is, where the occiput is caught half-way around and the flexion is poor. (c) In this set of cases the forceps is applied to the sides of the pelvis. After a few tractions the head either starts to rotate and we help it along a little, or we inaugurate the rotation with the forceps. With each advance we readjust the blades without removing them. The occiput gradually turns so that the sagittal suture is transverse, then the occiput passes beyond the transverse line and finally, as the head comes out under the pubic arch, it assumes a directly anterior position and is easily delivered. (d) There are a few cases, however, which we see now and then in hospital practice where the

head is wedged in the pelvic outlet, so that the above procedures will not succeed, and where a slight amount of force is necessary to obtain anterior rotation.

Some authorities recommend the straight-bladed forceps. Others use the ordinary forceps but with the pelvic curve reversed. By the former method we are rarely successful, and by the latter we run too much risk of injuring the mother's soft parts. The correct way to handle these cases when the first three methods fail is as follows: If the case is an R.O.P. position, regard it primarily as an L.O.A. position, and then introduce the blades in the usual manner, applying them to the sides of the child's head. Next, without force, carry the handles of the forceps to the left thigh of the patient. By this maneuver the flexion is increased and the tips of the blades are in the middle of the pelvic canal. Then, with little force, swing the handles downward, describing an arc of a circle. The head turns to an R.O.T. position first, and then, as the handles complete the arc, carrying them as far posteriorly as the perineum will allow, the occiput gets under the pubic arch. In this way the tips of the blades are still in the axis of the pelvic canal, not doing any harm. Now hold the head in position for two or three pains, with the pelvic curve of the forceps inverted, but using no traction. This is done to prevent the head from returning to its former position, and in order to allow the body of the child to rotate anteriorly to accommodate itself to the head. After we are sure the occiput will stay in front remove the blades. Many of the cases will now terminate spontaneously. If there is still delay, the forceps can be reapplied, and the delivery accomplished with ease. When one examines this method carefully, he will find that it is not so dangerous as he imagines, although it should only be used by a man skilled in the use of forceps. The neck of the child is not twisted beyond what it can safely stand, because the body will likewise rotate. The force used is not necessarily great, nor are the mother's soft parts injured if proper care is employed.

The Tucker-McLane solid-bladed forceps is the best variety for use in all the above methods, not only on account of the facility of introduction, application, rotation and removal, but also because they mark the child less.

In conclusion, let me say that the last method is not often necessary. It has been known at the Sloane Maternity Hospital for at least nine or ten years, yet in 104 persistent occipitoposterior positions in the series of 5,000 cases there, above mentioned, it was practised only seven times.

In my private practice, out of nine posterior positions with the head *low down* in the pelvis, needing assistance by the forceps, all were easily rotated anteriorly by the first three methods just described.

At the Sloane Maternity Hospital, in 1,000 vertex cases (8,000 to 9,098), 109 were R.O.P. positions; 85 were L.O.P. positions; 131 were R.O.T. positions; 210 were L.O.T. positions.

Of these 1,000 cases 523 were admitted in labor. Of the L.O.T. and R.O.T. positions 183 were admitted in labor.

In 5,000 cases (6,000 to 11,000), 104 were persistent occipitoposterior positions.

Fifty-five were allowed to be born occipitoposterior, but only in four was the perineum slightly torn, though nine were primiparae; one child died, not counting the non-viable and very premature cases up to 7½ months.

Twenty-seven were rotated manually, and in four of these the forceps was subsequently applied; one perineum was torn and one child died; nine were primiparae.

Nineteen were rotated by forceps, but only seven by the reapplication method; two were rotated using forceps as a vectis; three perineae were torn; five children died; 16 were primiparae.

One child already dead—delivery by craniotomy.

Total deaths, children, eight (counting craniotomy case).

Total perineal tears, eight.

Private practice: In 100 vertex cases 27 were R.O.P.; 8 L.O.P.; 15 L.O.T.; 6 R.O.T.

1. Of the occipitoposterior remaining persistent above, at or in the brim, five required high forceps, two justo-minor pelves, two flat pelves. All of them rotated anteriorly on applying the blades.

2. At midpelvis, or just below: three required forceps, all rotated anteriorly in applying the blades.

3. At outlet: Two were rotated manually and then were born spontaneously; three were rotated manually and then the forceps was used; five rotated in applying or readjusting the blades; one rotated using one blade as vectis; six after normal rotation required the forceps. There were no deaths of children. There were six moderately torn perineae in the above forceps cases. (Two tears were due to rapid delivery to save the child.)

SCURVY IN INFANTS.¹

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I HAVE recently seen in consultation two very similar cases of disease in infants; yet in each case the physician in charge frankly stated that the symptoms were new to him, and that he did not know how to interpret them. Having seen a number of such cases before, and feeling sure that the condition is a not uncommon one, I am prompted to call the attention of the profession once more to scurvy as it occurs in infants. My recent cases were as follows:

Case I.—Seen in consultation in Menlo Park, January 9, 1904; a male infant, aged eight months. For several weeks the baby's appetite had been failing and he had been growing more

¹Read before the California Academy of Medicine.

and more restless and sleepless. Several times during these weeks his napkin had been stained with blood passed with the urine. Recently great tenderness had been noticed about both lower limbs, so that he screamed when raised or handled, or especially when his limbs were elevated to change his napkin. Finally, a few days previous to my visit it was observed that the gums about his two upper incisor teeth were swollen so as to nearly hide the teeth, were dark purple in color and bled when touched.

Case II.—Seen in consultation in Alameda, February 3, 1904; a male infant, aged thirteen months. This baby, so the mother said, cried violently whenever his legs were moved, as in putting on his shoes and stockings or changing his napkin; and had done so for eight or ten weeks before I saw him. He had gradually grown worse in this regard, so that now he would no longer sit up and could not lie in any position for any length of time without crying from pain. The mother knew of no cause, and the baby had been treated for a long time for rheumatism. He screamed violently when his legs were examined; both were found swollen from the knees down, markedly about the ankles and feet. The baby was found to have four teeth—two upper and two lower incisors; the gums about these were much swollen, so that the teeth were nearly hidden, were dark purple in color and bled when touched.

In each of these cases the symptoms meant scurvy and could mean nothing else. I observed my first case of this sort in July, 1895, and reported it in the *MEDICAL NEWS*, February 29, 1896, this case being, so far as I am aware, the first one reported from the Pacific Coast. Subsequently a collective investigation of the subject was made by the American Pediatric Society at its annual meeting in 1898; and to this report I contributed the history of three cases observed to that date. Including the two cases herewith reported, I have now seen ten cases of scurvy in infants.

Etiology.—The disease occurs mainly during the first year of life. It seems to be dependent in some way upon the food given; but it occurs in infants fed on many different kinds of foods, and does not occur in all infants fed on such foods. Most often infants who develop scurvy are taking some one of the proprietary foods. In my own cases, Mellin's food, Eskay's food, Horlick's malted milk and condensed milk have been the foods taken at the time the scurvy developed. But I have the records of many other infants fed on exactly similar formulæ, who never developed any sign of scurvy. No one has ever satisfactorily explained how the diet causes the symptoms, or what the substance is that by its presence in or absence from the diet might lead to the pathological changes observed. In other words, the exact cause of scurvy in infants is still unknown.

Symptoms.—These are quite characteristic and diagnostic. The most important are (1) *pain on*

movement of the lower limbs; such movement, whether voluntary or due to handling, causes the infant to scream with pain; as a consequence the limbs are not used and they appear paralyzed; frequently, but not necessarily, the thighs or legs are swollen and brawny to the touch; more often along the shaft of the bone than at the joint. All of these symptoms are due to a greater or less degree of subperiosteal hemorrhage. (2) *Purple swollen gums.* This symptom occurs most often in infants that have teeth through the gum or about to appear, and involves only the gum about such teeth. It has been observed in gums that had no teeth through them; but not so often. The gum is so swollen as almost to bury the teeth, is usually dark purple, almost black in color, is spongy and softened and bleeds easily. (3) *Subcutaneous hemorrhages.* These resemble bruises or "black and blue" marks. In the first case I ever saw, in 1895, the infant had a typical "black eye." In another there was a large purple area over the buttock and thigh as if the baby had been beaten. Such spots may appear in any part of the body, and usually take the form of good-sized patches rather than of diffusely scattered purpuric spots. (4) *Hemorrhage from mucous membranes.* This may be from the mouth or throat; from the nose; from the bowel; or from the bladder—bloody urine had been one of the alarming symptoms in Case I, herewith reported. (5) *Anemia and Malnutrition* are usually complicating conditions, but in no way peculiar to scurvy.

Diagnosis.—Given an infant six months to a year old; a history that the legs are tender and the baby screams when they are moved—scurvy is always the most likely explanation. If on examination the gums are found swollen, discolored and bleeding; or if black and blue marks are discovered or have previously been seen by the mother on the baby's body, the diagnosis may be made with almost absolute certainty, especially if the infant is and has been for some time fed on one of the proprietary foods.

Differential Diagnosis.—The most frequent mistake made is to call the case *rheumatism*. It cannot be impressed too often or too strongly that young infants do not have rheumatism—at least it is so extremely rare that practically it may be left out of account; while scurvy, on the contrary, is not at all an uncommon ailment in the first year of life. The disinclination of the infant to use the limbs now and then leads to an erroneous diagnosis of *paralysis*; but paralysis never gives rise to pain and tenderness of the limbs as scurvy does; an examination will show that the loss of power is apparent rather than real. The condition of the gums described should always make the observer suspicious of scurvy; but I have once seen a case where the gums had been lanced, because their swollen, purple state was supposed to be due to difficult dentition. It is rare to see purpura hemorrhagica in the first year of life and no matter how many hemorrhages have occurred into the subcutaneous tissues and from mucous membranes, scurvy is always the more

likely cause in a young infant; besides the symptoms in limbs and gums are almost invariably coincident and complete the picture. Finally, an injury to the limb is often suspected, but rarely occurs in such young infants; for they cannot walk and have so little opportunity for traumatism.

Prognosis.—Scurvy is a disease in which proper treatment works a miracle. It has no tendency to spontaneous recovery; but when recognized and given the proper care, improvement is immediate and cure is surprisingly rapid. No other disease affords the physician a better prospect for brilliant results.

Treatment.—Just three measures are indicated for the cure of scurvy: (1) Discontinue the proprietary food. Substitute for it a mixture of fresh milk diluted with water or with oatmeal water. (2) Give fresh orange juice, in dose of one or two teaspoonfuls three times a day. It is surprising how babies with scurvy take to this and seem to enjoy it. (3) Give freshly expressed beef-juice, squeezed from rare steak, in dose of one or two teaspoonfuls three times a day. (4) Give no drugs at all.

All of my cases have been treated in this simple way. In Case I, herewith reported, every symptom had vanished in four days after treatment as above. In Case II, after ten weeks of suffering the baby was absolutely well in one week. The recognition of scurvy is easy when only we realize that such a disease exists; the treatment is so simple that we feel almost ashamed to take the credit for the good it accomplishes; and the change we are able to effect at once in a disturbed and discouraged household is so magical that scurvy in infants becomes really the most fortunate disease the physician can ever hope to meet.

MEDICAL PROGRESS.

MEDICINE.

Diminution of Liver Dulness.—It is now well recognized that diminution or even absence of liver dulness is not a reliable sign of the pressure of free gas in the peritoneal cavity. S. V. PEARSON (Med. Chron., March, 1904) has carefully examined 140 cases of ulcer of the stomach and finds that 33 per cent. of that number have shown a considerable decrease in the liver dulness at some time during their stay in the hospital. In none had perforation occurred. He does not believe that cases of gastric ulcer are particularly more liable to show this decrease in dulness than other diseases. This number did not include any in which the decrease was due to emphysema or other lung conditions nor any in which the diminution was at all ambiguous. Complete absence of dulness was present in three or four cases of simple gastric ulcer. The explanation of this phenomenon is not at all clear. It is not associated with any marked degree of distention, nor with pain or tenderness. It has been suggested that this condition was due to a distended gut getting up in front of or behind the liver, marking the normal dulness or actually pressing the liver upward. It has been found that the great majority of cases are in young females, and this is the case, no

matter what the nature of the associated disease. This marked decrease in dulness also frequently occurs very commonly at the time of the monthly period whether it be associated with pain or not. Again, the amount of food in the stomach may have some influence, but the complete explanation of the condition is by no means satisfactory.

Diazo and Widal Reactions in Typhoid Fever.—It requires a wide experience and careful observations to determine the true value of many of our clinical tests, and, therefore, a great diversity of opinions still exists in regard to the importance of positive results in the above tests. C. B. KER (Practitioner, March, 1904) believes that the diazo-reaction of Ehrlich may be of considerable assistance in the diagnosis of typhoid because it is usually present from the fourth to the sixth day, when many of the other signs are still absent. It is, however, usually present in several other diseases, being almost invariably present during the eruptive stage of measles, but this is, of course, of very little importance. It seems to be always present in typhus and is usually found in miliary tuberculosis. It is occasionally present in lobar pneumonia and more rarely in bronchopneumonia. The value of the test is rather its absence than its presence. A case of continued fever which does not give the reaction between the sixth and twelfth days is in all probability not enteric fever. On the other hand, if it is present, it is necessary to exclude the eruptive fevers, miliary tuberculosis and pneumonia. In regard to the Widal reaction there are still a great many physicians who seem somewhat skeptical concerning the dependence which should be placed upon the significance of its presence. No doubt the reason for this is that the results which are frequently obtained follow methods which are not sufficiently skilful and careful. It requires a great deal of painstaking work by an experienced man to obtain valuable results. The author uses a dilution of one to thirty, but most authorities now consider the reaction positive only when dilutions of one to fifty are used. It may now be safely said that a positive reaction means that the patient has enteric fever at the moment or else has suffered from it previously. A negative reaction during the first two weeks means little or nothing. If it is still negative in the third week there is a strong presumption against typhoid and if it remains negative in the fourth week the idea of typhoid may be dismissed.

Hypodermoclysis in Pneumonia.—In spite of all the innovations which have been made in the treatment of pneumonia the death rate has been very little changed during the past three or four decades. Statistics, however, in such a disease as pneumonia, in which so much depends upon the age, the previous habits and condition of the patient and the "genus epidemicus" are not only not infallible but often misleading. F. P. HENRY (Med. Chron., Feb., 1904) who was the first to use hypodermoclysis in the treatment of pneumonia, believes that it is theoretically indicated in every case of pneumonia although he does not employ it in many mild cases. It dilutes toxins and favors their elimination; it preserves the alkalinity of the blood, which is one of the most important properties of the vital fluid and, finally, certainly tends to prevent the formation of heart clot, which the writer believes to be a frequent cause of death in pneumonia. The solution employed contains 50 grains of sodium chloride to the pint of distilled and sterilized water. He uses a large syringe or chest aspirator, the action being reversed, and injects from eight ounces to a pint once a day.

Tardy Abscess of the Liver.—Attention is called to the fact that tropical dysentery may be followed by hepatic abscesses a long time after the latter has sub-

sided, by P. K. PZL (Berl. klin. Woch., April 4, 1904). He reports three cases where the lesion came on at varying periods from eleven to twenty years after the dysentery had cured and after periods of good health. There was no other cause apparent for the production of such an abscess except the former attack of dysentery and idiopathic abscesses are extremely rare. The author thinks that encapsulation of some small pus focus had taken place, which had remained quiescent for years, but that at the periphery a certain number of microbes had remained alive. Such encapsulation has been proved in the case of typhoid bacilli, where in one instance they were found encapsulated in a focus in the tibia fifteen years after recovery from typhoid.

Toxic Agent of Cholemia.—Icteric patients sometimes develop an alarming series of cerebral symptoms which usually end in coma and death. The direct cause has frequently been a matter of speculation and it is as yet undecided whether the bile pigments, bile acids or the loss of hepatic function are at fault. A. LANDAU (Deutsch. Arch. f. klin. Med., Vol. 79, Nos. 5 and 6) noticed a close resemblance to diabetic coma and concluded that the whole condition is an acid intoxication. The common bile duct was ligated in a number of rabbits and the blood titrated every day until death, which generally occurred on the fifth or sixth day. The alkalinity gradually diminished day by day, but not to a sufficient degree to account for the symptoms on the basis of an acid intoxication. The amount of carbon dioxide was also found considerably below normal. Since animals with much less alkali have been known to live for days, probably other facts bring on the fatal issue.

The Value of the Phonendoscope.—The improved phonendoscope has been thoroughly tested by D. SEHRWALD (Deutsch. Arch. f. klin. Med., Vol. 79, Nos. 5 and 6), and found by him to possess no advantages over the ordinary stethoscope. As resonator it can only magnify one particular sound, while all the others are diminished in intensity or suppressed altogether. The complex sounds of the heart and lungs are thus reproduced very imperfectly, and their character considerably altered. Even the use of the valve on the resonator does not improve matters, for if opened, the resonator will lose its property as sounding board and fail in transmitting low sounds. Moisture and hairs interfere considerably. In employing the phonendoscope for auscultatory percussion, one generally obtains oval or circular figures, whose size does not depend upon the organs percussed but chiefly upon the moisture and tension of the skin. A heart-shaped figure can thus be percussed after the heart is removed from the thorax and in other places remote from the heart. The common stethoscope does not give such loud sounds, but is much more satisfactory.

Diagnosis of Gouty Deposits in the Ears.—W. EASTEIN (Deutsch. Arch. f. klin. Med., Vol. 80, Nos. 1 and 2) finds that in patients suffering from gout or rheumatism, nodules are occasionally discovered in the auricle, which at first sight impress one as tophi, yet are situated in the cartilage and do not contain urates. They are sometimes cysts, sometimes cartilaginous excrescences and, though occurring most often in gouty individuals, do not justify the diagnosis of gout with the same certainty as in the case of uratic deposits.

SURGERY.

Anesthesia in Abdominal Surgery.—When we come to the selection of anesthesia in celiotomy, it will, in the majority of cases, be one between ether pure, with nitrous oxide, with oxygen or chloroform, but J. J. G. WILLIAMS (Am. Jour. of Obstet., March, 1904) thinks that by most operators ether alone will be chosen. Spinal anesthesia with cocaine has been tried and found

wanting. The author gives the following reasons for preferring ether: (1) It is nearly always possible to procure a fresh supply. This is not true of chloroform. (2) Ether is safer, there being one death in 10,000 cases, while chloroform gives a mortality of one in 2,000 administrations. (3) The patient can be placed under ether nearly and quite as quickly and quietly as with chloroform. (4) With ether one can keep the patient pretty much in the stages desired; with chloroform, the author has seen them go quickly from sensation of pain to deep narcosis. (5) When one is compelled to place the anesthesia in the hands of a layman or, as has frequently been done, the domestic servant, ether is safer. Chloroform is likely to kill early, during the first few inspirations or when struggling occurs. (6) When organic heart disease is present, ether, for a time, stimulates the heart. (7) Ether has been administered to alcoholics, those with pulmonary tuberculosis and with pathological kidneys, and in these cases it is as safe as any general anesthetic, if not safer. When the patient has been anesthetized, there are two methods of continuing the administration during the operation: (1) The anesthetic may be given by dropping one-half to one dram over the nose-tip every minute or so. (2) Use the "drop method" as in giving chloroform, allowing one drop to slowly follow another. Always withdraw the anesthetic when tapping a large cyst or ascites, and when removing bulky fibroids, keep it withdrawn until the patient shows signs of returning consciousness.

Subsequent History of Gall-bladder Cases.—Question blanks were sent to the last 350 cases of gall-bladder disease operated by H. KEHR (Münch. med. Woch., April 5, 1904), exclusive of carcinoma, to determine the results and after-effects of the operation. Most valuable statistics were obtained, which prove that the relief is generally permanent and the danger slight, with increased experience. Thus stones were left behind in only 2.5 per cent., but the operator was aware of this in more than half, where the relation of the biliary ducts was so complicated that a radical procedure could not be restored to. Most of the others passed the stones spontaneously and are free from symptoms, and only one case necessitated a second operation. In 350 cases only one mucous and one biliary fistula remained behind and herniæ were encountered in only 11, where extensive suppuration required an elaborate tamponade. Colic, due to adhesions, was observed twelve times, due to inflammation five times; in these 17 cases the appendix was removed five times, in three a pyloroplasty and in two a gastroenterostomy was performed and one suffered from hepatoptosis. Care must be taken not to mistake subsequent renal colic for recurrent biliary pain, since both conditions may exist together.

Gangrene of the Hollow Viscera.—Mesenteric thrombosis, while rare, has been referred to by numerous authors. Nevertheless, like many other obscure abdominal conditions, there is certainty that its presence has been overlooked in many cases and that it is much more frequent than usually supposed. ROSWELL PARK (Ann. of Surg., April, 1904) calls attention to the most significant symptoms. They are as follows: (1) Sudden onset. The pain begins instantly and is apt to be overwhelming in its character. It cannot be quieted by an ordinary opiate. There are, however, cases which have run their course without any appreciable pain. (2) Diarrhea. This is usually an early symptom, evacuations being profuse and often bloody. (3) Obstructive symptoms. These are sometimes those of the ileus, sometimes of constipation. (4) Vomiting. This usually occurs early, the material being bloody and early fecal. (5) Rapid pulse. This may run as high as 140. (7) Subnormal temperature. (7) Meteorism. (8) Ab-

dominal rigidity. It is said that when the inferior mesenteric artery is involved, tenesmus becomes a prominent characteristic. A differential diagnosis has first to be made between the perforating ulcer of the stomach or duodenum; 15 per cent. of gastric ulcers perforate. Second, acute obstruction. This includes all rarer forms of internal hernia. Third, pancreatitis. This may very closely simulate mesenteric inclusion, the suddenness of the disease in the latter case being the only distinguishing feature. Fourth, acute splenic infarct. This is naturally a difficult condition to differentiate from obstruction to one of the mesenteric vessels, because it is usually caused by embolism of the splenic artery. Fifth, acute appendicitis. In every detail except in degree, acute appendicitis simulates the greater disease under consideration. Sixth, acute cholecystitis. Here there is usually a history of previous disease of gall-stone colic. Seventh, extra-uterine pregnancy. Eighth, intrathoracic lesions; left-sided pneumonia is one of these. The only recorded case of mesentery exclusion not proving fatal is recorded by Chiene. The branches of the mesenteric arteries were found filled with the injecting fluid of the dissecting room, their main trunks, however, were blocked by an old embolic process. The blood reached the mesenterics through the left and middle colic vessels. These cases seem to be beyond the realm of hope even if the very earliest surgical attention be given them. Nevertheless, in view of the extraordinary length of gut which has been successfully resected, there may be cases of mesenteric embolism of a mild degree which can be saved by early intervention. At all events, no time should be wasted in speculation as to the character of the lesion, it being evident that no such case as would be lost without an operation would be lost in consequence of it. Of these cases, as of most others in the hands of competent men, it should be said that they die in spite of operation, not because of it.

Diagnosis of Frontal Sinus Osteoma by the X-Rays.—The difficulties attendant upon the diagnosis of this condition ought to be simplified by the employment of the Roentgen rays, but thus far no skiographs of the lesion have been published. G. PERTHES (*Archiv f. klin. Chir.*, Vol. 72, No. 4) reports a case where the X-rays proved to be of the greatest importance both as regards the diagnosis and the determination of the site of operation. By the removal of the growth, the malposition of the left eye was corrected, the headaches and other symptoms disappeared. Without the rays it would have been impossible to recognize the presence of a bony tumor on the roof of the orbit, which was displacing the bulb. No elevation could be detected on the forehead and the tumor might as well have been an exostosis. The skiagraph taken in two planes showed that the growth extended 4 cm. above the roof of the orbit and beyond the median line to the other side.

Thrombosis of Superior Mesenteric Artery.—An interesting case of thrombosis of the superior mesenteric artery, in which an early operation was done without, at that time, a full knowledge of the cause of the trouble, is reported by H. G. MUND (*Interstate Med. Jour.*, April, 1904). As in almost all instances of this condition, the case presented the signs and symptoms of acute intestinal obstruction and the operation was done to relieve it. No obstruction, however, was found and the small intestine showed a rather marked congestion and in some places there was a particularly tight, tonic, muscular contraction present, rendering the caliber of the small intestine extremely narrow. This contraction would involve several inches in length of the intestine in various portions with intervening parts of the gut normal. Then

the contracted portion would relax and the tonic spasm of the muscular wall occur in other parts, not traveling in continuity. After the operation, gas and feces were expelled by rectum but the constitutional symptoms and signs grew worse and he died in four days. Autopsy showed a gangrene which began just below the duodenum and extended throughout the small intestine and involved the cecum and about one-half the transverse colon. The superior mesenteric artery was found closed by a thrombus which began about one-half inch from its origin from the aorta. The other abdominal organs showed no important changes. No sufficient cause could be established for the thrombosis in this case, for the man was only thirty-six years old; there was no history of syphilis, no heart lesion, no atheroma, no embolus elsewhere. A slight twist of the mesentery upon itself was, however, found, and it is possible that sufficient injury occurred from it to determine the site of the beginning thrombosis. The author is inclined to the belief that many of the so-called cases of embolism are really instances of thrombosis, probably due to some distinct injury.

Surgical Treatment of Goiter.—A large number of parenchymatous goiters, successfully treated during the past fifteen years by a combination of internal and external methods, are reported by C. H. MAYO (*Jour. Am. Med. Ass'n*, April 23, 1904). He also has operated on 110 cases for the relief of some type of thyroid tumor. Of these, 34 were for exophthalmic goiter, with six deaths. He prefers the Kocher collar incision as giving the greatest exposure and the least scar. He precedes anesthesia with morphia subcutaneously and uses ether by the drop method, unless there is extreme dyspnea or marked exophthalmic symptoms. In such cases he uses cocaine by injection. The exophthalmic cases which recovered from the operation were all benefited within three months; in only 25 per cent. was the improvement partial, the exophthalmos being slow to disappear. None of those who lived were made worse and those in whom death occurred were the most severe types of Graves' disease, with tachycardia of from 130 to 150.

The Appendix and Typhoid.—The prophylaxis in perforative peritonitis from typhoid fever is the pivot on which every effort in treatment should revolve, until either the cause is removed or accuracy in diagnosis has enabled the clinician to recognize the perforative stage, as prompt interference after perforation has taken place has evidenced any marked lowering in the mortality table. The appendix is the seat of perforation in about five per cent. of all cases, and L. J. HAMMOND (*Jour. Am. Med. Ass'n*, April 16, 1904) claims that in addition to this there is a large number of cases occurring in the ileum and ascending colon that can be directly traced to preexisting disease of the appendix. In support of this he reports two cases, where the tension from bands of adhesions between the appendix and other parts of the gut caused rents in the ulcerated patches. He believes that where the appendix has been the seat of a previous inflammation a disease like typhoid is sure to light up a recurrence. With this in mind, when a case of typhoid fever presents among its earliest symptoms pain to the right of the hypogastric region, with tenderness, nausea or vomiting, aching or discomfort in the groin, anorexia, and lastly, rigidity of the right rectus, a relighting up of a previous disease should be suspected, for it is now known that the right iliac fossa is not tender during the early days of typhoid, before the bacilli have been deposited in the Peyer's patches. Immediate laparotomy should then be done, removing not only the appendix, but also the agglutinated coils of the ileum, which thus has its nutrition impaired and consequently its structural resistance is diminished.

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"LEAD, KINDLY LIGHT."

BROOKLYN, which has hitherto been celebrated principally for its churches and its bridge connection with what it fondly regards as its suburbs, has now come out in a new rôle, and seems to have developed into a place where they "find out things." Their last discovery, and one which will be of greater service to their neighbors perhaps than to themselves, is the rather startling fact, that artificial teeth, made of porcelain, are a certain and reliable protection against sudden death, due to poisoning from the inhalation of illuminating gas.

Now, whatever may be charged to the account of the inhabitants of Brooklyn, they are certainly not, as a class, addicted to the playful and labor-saving habit of "blowing out the gas," and the guileless and unsophisticated stranger who has money to burn, is much more apt to consume it in feeding the flame of some red lamp on the altar of a New York dive, on a Saturday night, than he is to drop it with an unshaking hand into the contribution box of a Brooklyn church on Sunday morning. Actuated, it would seem, by a realization of this fact, and doubtless influenced by the belief that short credits make long friendships, the authorities of the gas companies of Brooklyn

have evolved from their inner consciousness a system which, while it may bring peace to the treasurer, certainly passeth all understanding of other communities. For these gas magnates take no chances. With one fell swoop they have done away with bills and the difficulties of their collection, and have eliminated all meters from the equation of their business enterprises. In place of them they have set up an automatic fountain head, a thing of cogs and balances, that acts upon the introduction of a silver quarter of a dollar as does the more humble slot machine, when the insertion of a nickel throws down a bar of stored muscular energy in the shape of chewing gum, or, like Helen's babies, "makes the wheels go round."

These mechanical devices are not only useful, but are highly ornate, and are calculated to make any home, uninhabited by the color-blind, happy. For the directions "Drop a quarter in the slot and secure your gas supply," which are tastefully enameled in various chromatic schemes on their convex fronts, not only proclaim the touch of the modern impressionist, but are as direct, and as easily understood as the inscription painted by some wag on the lodge of the Indians in the vast wilderness of the Wild West Show: "Throw a brick into the tent and see the Indian come out." All this is easy and plain sailing for the company, and would be simple enough for the consumer, if each apartment had a separate and individual connection with the gas supply, but when the machine in one room turns on the gas in the rest, so that one man's meat becomes another man's poison, the complications are apt to be dangerous, to say the least.

The first victim to the grasping greed of this monopoly seems to have been a certain Dr. Westfall, who, returning late to his room in his boarding house, lighted a match, and applying it to the gas burner, suddenly realized that he was in personal contact with a corporation that did not propose to let its light shine before men without adequate and guaranteed compensation. A hurried search through his clothes and belongings failed to discover a coin of the proper denomination, and as there were some five flights of stairs between the doctor and the outer world, and as the patent machine had not been perfected to a degree that would enable it to make change, he quietly undressed, and going to bed in the dark, was soon asleep.

Up to this time, according to the evidence, Dr. Westfall's course of action had been marked by the good sense and calm deliberation that is es-

sential to a professional man, not only in Brooklyn, but in other places. He did not have a silver quarter; there was no possibility of obtaining one from the neighboring shops, which were, of course, closed at midnight, so that, like "Little Ned who was sent to bed," he also, in our judgment, "acted right." His one mistake, however, was that he did not turn back the key after his futile endeavor to light the gas. Shortly after this a fellow lodger in another part of the house came in, and finding that his lamps, too, were untrimmed when the bridegroom came, he dropped the requisite coin and the gas immediately began to flow. It flowed, however, not only into his own room, but also into that of Dr. Westfall, and with the usual result. But the sleeping man awoke. Something had gotten into his throat and was strangling him, and it was only with the greatest difficulty that he reached the window and throwing it open screamed for help.

And now this gentleman from Brooklyn comes into the arena of controversy with a brand new theory, that porcelain teeth are a perfect safeguard against asphyxiation, and that no well-established victim of the gas-blowing habit should be without them. For he tells us, "escaping gas causes the unconscious sufferers to grind their teeth and says that in grinding his china molar was broken and that the fragments falling into his throat, awakened him." All this may be and probably is true, but we doubt if what Bret Harte described in the address to the pliocene skull as "a thrill of the maxilla and a lateral movement of the condyloid process" would be always sufficient to dislodge the results of modern, up-to-date dental substitution, as in some cases tooth would be undeniably stronger than friction. At all events, an ounce of prevention is worth a pound of cure, and it would have been easier and far cheaper in the end for the doctor to have coughed up the price of the gas than the fragments of his tooth, which must have been sharper even than having the proverbial thankless child.

As to the dispute between Dr. Westfall and the gas company, our sympathies are, in this case, with the corporation. We do not know what particular specialty Dr. Westfall is following, so, far be it from us to suggest that he may be a dental surgeon who is seeking to advertise the virtues of porcelain teeth as a protection for persons who blow out the gas. But reciprocity is the soul of mutual compacts, and as he gave no quarter to the company, he can expect none in return from them, their machines or anything that is theirs.

THE PATENT MEDICINE CURSE.

WE have watched with no little interest the amount of attention that has been aroused in many quarters by the article of Mr. Bok, the editor of the *Ladies' Home Journal*, with regard to the patent medicine curse, which appeared in the May number of that monthly. Something over a year ago there was copied, with due acknowledgments, in one of the departments of the *Ladies' Home Journal*, a passage from the Byways of Medical Literature of the MEDICAL NEWS, in which it was shown that most of the patent medicines used in this country contain considerably more alcohol than beer or even wine, and that many of them compare not unfavorably in alcoholic strength with the ordinary whisky that is sold in saloons. Not long since a personal communication from Mr. Bok asked us for further information with regard to this subject, which, so far as it was possible, we supplied, calling attention particularly to the analyses published some years ago by the Massachusetts Board of Health. We have felt then that it was rather the proper thing for us, in view of the sensation that has ensued, to see what others would say before taking part in the interesting discussion.

We are overjoyed to note that Mr. Bok has hit straight from the shoulder, that his attitude has attracted widespread attention, and has led to comment on the part of most of the self-respecting journals throughout the country. Of course it cannot be expected that newspapers which derive a considerable portion of their advertising income from display announcements of these patent medicines will give any space or notice to a movement that is likely to diminish the receipts of their advertising departments. An independent journal like *Collier's*, for instance, speaks out fearlessly and says: "Mr. Bok appears with an article of which any journalist might be proud, attacking an outrage with truth and potency. The people who drink or eat patent medicine number millions. Some do it to save doctor's bills, others because they find the patent medicine more effective, since no reputable doctor would give in quantity and kind what the patent medicine contains. The law which forbids harmless oleomargarine to be used as butter does not prevent poisons containing from 20 to 45 per cent. of alcohol from being sold as non-alcoholic." *Collier's* adds, "The Women's Christian Temperance Union busies itself with such important matters as christening ships with wine. Life insurance

companies, more intelligent, have begun to ask their applicants whether they have a habit of using patent medicines." These preparations are popular in prohibition States.

As Mr. Bok very truthfully points out in his article in the *Ladies' Home Journal*, it is to a large extent the religious journals throughout the country that have been most flagrant in their readiness to accept patent medicine advertisements. He says, "Beside me, as I write, are issues of some twenty different religious weeklies, the advertising columns of which are a positive stench in the nostrils of self-respecting people." There is no doubt of the truth of this. Medical journals have called attention over and over again to the discrepancies between the lofty declarations of the editorial and other columns of the religious press, and the utter sordidness of the advertising columns. Almost anyone who has the money and who does not make an open profession of immorality, can get into the advertising columns, even of the highest class religious periodicals. This field has been considered one of the most lucrative by medical advisers generally.

We note that another phase of the medical advertising evil has also been brought before the public just at this time. A number of sketches of Mr. Hearst, one of the presidential possibilities, have recently appeared, and in answer to one of them Mr. Norman Hapgood wrote a typical editorial as it should appear in the Hearst papers, but will not. He says:

"To the billion readers in our Hearst family,—one word. Let them examine this paper. They will find over a page of advertisements by quack doctors, of a kind which reputable papers will not print. They will find masses of advertisements on patent medicines. One contains 44 per cent. of alcohol. One, advertised as 'safe,' contains over 35 per cent. We know they are poison. We aid and abet clairvoyants, palmists, astrologers and card-readers. Why do we carry all these schemes to cheat the poor? Did you ever study proportion? Neither has the poor savage of Australia; but we have, and our morality is determined by the ratio of cost to what we get out of it. As it is in these petty swindles, so is it in the larger bunco games of politics. We defend the poor when it pays. We cheat the poor when it pays. Think it over."

Both of these excellent hits at the evils of medical advertising have appeared in *Collier's*, and yet *Collier's* itself lends its columns for due remuneration (we wonder if, as is said to be the case

with the religious press, the price for medical "ads" is higher than for any other advertising material) to medical advertisers who are likely to do just as much harm as ever did the alcoholic patent medicines. Every honest man now knows that medical advertising in the lay press is only for the purpose of exploiting poor sufferers whose ailments make them even less capable of proper judgment than before. The only position for a self-respecting managing editor to take is absolutely to refuse all such advertisements, no matter what the stipend offered for them. This Mr. Bok did some time ago with regard to the *Ladies' Home Journal*, and, as the result, has had the courage to take the next step of directly attacking the evil. If this example will be followed by other prominent journals there will be a distinct raising of the moral tone in editorial rooms generally throughout the country. Let us hope that the evolution is about to come. The medical profession should be ready to encourage it in every way and should note the papers that are striving to be honest in the midst of so much disgraceful sordidness.

SOCIETY OF SANITARY AND MORAL PROPHYLAXIS.

WHAT promises to be a most important movement in diminishing the spread of venereal diseases in this country—viz., the organization of a society of sanitary and moral prophylaxis—seems to be on the eve of successful accomplishment. This project has received the unanimous endorsement of the New York County Medical Society and the active cooperation of many influential members of the laity has been promised.

As set forth in the paper of Dr. Morrow, in the present issue of the *MEDICAL NEWS*, the prophylaxis of venereal diseases, from their peculiar nature and mode of propagation, is not purely a sanitary problem; it is essentially a sociological problem. To combat the evil there is required a union of all the social forces—medical, moral and legislative.

Any attempt to introduce the Continental system of regulation in this country has always encountered a strong hostility on the part of the moral element of society—but there can be no opposition to a movement which is chiefly along the lines of education of the rising generation in matters relative to the physiology and hygiene of the reproductive organs.

Readers of the *MEDICAL NEWS* may recall our full reports of the two International Congresses

for Sanitary and Moral Prophylaxis, held at Brussels within the past five years. The organizations which have evolved from these meetings have had a very marked success in European countries; the German society now numbering over four thousand members and the French society almost a thousand. Swiss, English, Dutch, Italian, and Russian branches are operative.

It is fitting that an American organization, in sympathy with the European movement and representative of the best elements not only in the medical profession but of the law, the clergy, and the layman should be launched at this time.

We can confidently hope for a permanent organization in the very near future.

REPORT OF THE ENGLISH CANCER RESEARCH FUND.

It has always been a characteristic of English science, and, indeed, of English thought in every field of human interest, that its greatest advances and its most noted triumphs have come not from the schools or the institutes, but from individuals working alone and independently. Herbert Spencer, Charles Darwin, Mill, Buckle, and innumerable other names attest the truth of an observation which is by no means new, yet always remarkable. In France, the Academy and the University of Paris have been the springs and sources of all progress; in Germany, it is hard to discover a famous name unadorned by the title of Professor or Director.

The establishment, therefore, of a special fund, of an institution, under the patronage of His Majesty the King and under the presidency of H.R.H. the Prince of Wales, for the investigation of the causes and nature of cancer, is an experiment which will be watched with much interest. It is of significance inasmuch as it takes official cognizance of the tremendous growth and the really serious national import of the disease. It is still further of significance inasmuch as it postulates that the problem is too vast to be entrusted to individual effort. These two considerations give abundant sanction to the establishment of the Foundation.

The first scientific report of the investigations of the Cancer Research Fund has just been published, and contains a résumé by Dr. E. F. Bashford of recent work in the laboratory. In consonance with the essential idea of the Fund, the work has been undertaken along extremely broad

and extensive lines of research, comprising the zoological distribution, the transmissibility, and the comparative histological and cytological characters of malignant new growths. These are all large and fundamental problems, which necessitate the accumulation of a vast amount of material, of data, and of labor, and are eminently within the domain of such an institution, as contrasted with the problems accessible to the individual investigator. As might have been anticipated, the early results are suggestive, promising—but nothing more; indeed, to expect more would be entirely to underestimate, and mistake the nature of the issues.

It appears now to be a matter beyond dispute, that tumor formation is a condition which maintains not only among men, but among all forms of domesticated animals, and, as well, among wild vertebrates from the fish up. The only general factor which seems to influence its origin is the mature age of the victim. The tumors, as in man, derive their nature from the character of the parent tissue-cells, and are broadly divisible into the epiblastic and mesoblastic types. These data are of importance as revealing the action of some generalized etiological factor. It is evident that the immediate problem is to determine whether this be of a parasitic nature or not. Experiments in the transmissibility of tumor, therefore, form one of the most interesting and vital aspects of the work. It has long been known, from the investigations of Jensen and others, that malignant new growths are inoculable under certain circumstances from one animal to others of the same species. The conditions governing the success of these inoculations, however, seem to indicate almost conclusively that the transmission is one not of a parasite, but of the cellular growth itself.

Thus, in the last instance, the problem resolves itself into one of cellular biology, and it is apparently upon this standpoint that it must be attacked.

What are the factors which dissolve the laws of cellular interdependence within the organism, and endow a certain group of these elements with a faculty of vicious and unlimited proliferation, making of them, as it were, another unit within the greater unit? Two histological features of neoplastic growths have been pointed out, as affording a possible explanation of this metamorphosis in the character of the cells. First, there is the conjugation of nuclei which has been observed between cells of these growths; second,

there are the phenomena of so-called "gametoid" karyokinesis, in other words, a type of cellular mitosis which imitates that characteristic of the germinal cells (spermatic and ovarian) and differs markedly from that of the somatic cells. Conjugation, it is suggested, may act as a stimulus to cellular growth and proliferation, as in the protozoa. Reversal of the type of cellular division may be the cause of a reproductive capacity similar to that of the germ cells themselves.

These suggestions are very plausible, very interesting, and, indeed, quite attractive. It is wise, however, to temper one's acceptance, even if only provisional, with something of critical coolness. Granted that the phenomena are correctly interpreted as observed, it is somewhat rash to attribute to them an etiological significance. The processes of cellular division in new growths are notoriously so irregular and so heterogeneous, so rich in novel and abnormal conditions, that it appears unjustifiable arbitration to select one type as the *causa morbi*. It is certainly as logical to regard these particular variations as a phenomenon, a symptom, of the altered cellular activity, rather than as a cause. But even if they be so considered, it still remains to be shown that conjugation or reversion to the gametoid type are efficient causes in the metazoa of malignant proliferation. Certainly, there is as yet not a scintilla of evidence to prove this.

The difficulty of the problem is apparently commensurate with its importance. The Cancer Research Fund has not solved it, although its efforts appear to be directed along the most promising path. It is to be hoped that every advantage and opportunity will be offered for the prosecution of the investigation. Meanwhile, patience, reserve and serious criticism are the part and the privilege of those who eagerly look for some light in the darkness that envelops us.

ECHOES AND NEWS.

NEW YORK.

Appointment of Dr. Opitz.—Dr. Burton-Opitz has been promoted to the Adjunct Professorship in Physiology at Columbia University (P. & S.), with a seat in the faculty of pure science.

Resignation of Dr. Lefferts.—At a meeting of the Faculty of Medicine of Columbia University, held May 23, 1904, it was voted that the following minute be entered on the records of the meeting and that a copy thereof be sent to Dr. Lefferts: "Upon the acceptance of the resignation of George Morewood Lefferts, M.D., M.Sc., Clinical Professor of Laryngology and Rhinology at the College of Physicians and Surgeons, the Medical Department of Columbia University in the City

of New York, the Faculty of the College desires to express its high appreciation of the distinguished services which through three decades he has rendered to the institution. The organization and maintenance of an important practical clinical department in the College, eagerly sought by the students of successive generations, and a model of efficient administration, we recognize as a large achievement in the career of a busy practitioner. This long and faithful service and the generous gift to the College of a valuable collection of illustrative specimens and charts are held in high appreciation by his colleagues. A wise and successful teacher, an eminent practitioner, and a genial associate, the Faculty acquiesces in Dr. Lefferts' retirement with reluctance and regret."

Another Sneak Thief.—Several physicians in Harlem are anxious to get their hands on a gentlemanly sneak thief who has been helping himself to the contents of their households. The latest to suffer is Dr. A. J. Bilhoefer of 79 East 116th street, who was robbed of \$3,000 a few days ago. The thief called at the doctor's residence in his absence and said he wanted to see Dr. Bilhoefer on very important business. He said he would wait until the doctor came in. Mrs. Bilhoefer was in the basement and the servant went about her duties, leaving the man in the parlor. He then went through the upper floors and took all the jewelry he could find. The same thief is supposed to have paid a visit to the residence of Dr. I. L. Feinberg at 1716 Madison avenue and worked the same game. He did not make out quite so well, as valuables easily carried off were locked up. A number of physicians on the west side of Harlem have been caught by the same thief.

A Mosquito Year.—"Evidence is accumulating," says the *Times*, "that this is going to be a great mosquito year. It is reported that fishermen and surveyors have been obliged to abandon the oyster reefs of Louisiana because of the unprecedented numbers of these fever-infected insects. From New Jersey and other regions come complaints indicating that the mosquitoes are going to break the record. But while in some places concerted efforts are being made to exterminate, or at least mitigate, this plague, Manhattan is given over as a prey to the deadliest of all animals without a struggle. Central Park presents conditions which the most ingenious planning could hardly make more favorable for the breeding of mosquitoes. The ponds are in a deplorably neglected and shamefully filthy condition. A foul-smelling green scum covers the shallow, stagnant water; yesterday, old newspapers and tin cans were floating on one of them. The benches placed near these ponds are occupied every afternoon mostly by nurse maids in charge of infants. Mosquitoes abound, and the doctors are tracing cases of malaria to their bites. On windless nights the mosquitoes rise and molest families living in the highest stories of the buildings along Central Park West. It is getting to be risky even to walk through the park. And all this simply because the authorities in charge have not seen fit to resort to the well-known, inexpensive means of combating this evil. The simplest way to abate it would be to keep the water in the ponds clean enough for fish to live in them; they eat the larvæ of the insects. It is only since the fish found life impossible in the polluted water that mosquitoes have become abundant up town."

Pneumonia and Tuberculosis in Chicago and New York.—The term of pneumonia is nearly over for the present season. Since Nov. 1, 1903, there have been 3,703 deaths in Chicago from this cause out of a total of 16,780 deaths from all causes—a proportion of more than one-fifth (22.06 per cent.) of the total mortality. From consumption during the same period there have

been 1,806 deaths, or less than one-half those from pneumonia. Tabulated the deaths from these two causes of death for Chicago and New York between Nov. 1, 1903, and May 28, 1904:

	New York.	Chicago.
Total deaths, all causes.....	46,999	16,780
Deaths from consumption	5,228	1,806
Deaths from pneumonia	9,865	3,703
Proportion per cent. of all deaths—		
From consumption	11.12	10.76
From pneumonia	20.98	22.06

PHILADELPHIA.

Medico-Chirurgical Commencement.—At the annual commencement of the Medico-Chirurgical College held on May 28, diplomas were awarded to 127 graduates. Of these, 70 were in medicine, 36 in pharmacy and 21 in dentistry. The address to the graduates was delivered by President Swain of Swarthmore College.

Medical Class Organizes.—The class of 1894 of Jefferson Medical College held its first reunion in this city May 27, and effected a permanent organization. The following officers were chosen: President, Dr. W. H. King; Vice-President, Dr. R. C. Rosenberger; Secretary-Treasurer, Dr. W. A. Brinton. A reunion will be held every five years.

Blood Poisoning an Accident.—Judge Buffington, in the United States Circuit Court, has refused a new trial in the case of Katherine Nax against the Travelers Insurance Company, in which she recovered judgment on a \$5,000 accident insurance policy held by her husband. In 1902 Mr. Nax died from blood poisoning that resulted from paring a corn too deeply. The company refused to pay the policy on the ground that death was not due to an accident. A jury decided in favor of the widow and Judge Buffington, in refusing a new trial, said that death under such circumstances is as much an accident as if the victim had died as the result of any other unforeseen catastrophe.

Chemical Disinfection of Water.—In reply to the suggestion of the Trades League that electrozone be used for purifying the water supply of the city, Director Martin has virtually stated that chemical disinfection of water is, at present at least, impracticable. A report by Dr. Abbott shows that the electrozone plant at full capacity could furnish only one-twentieth the amount required for the smallest reservoir. In addition, it leaves a slight taste of chlorine as do any of the chloride compounds. Another method under trial will be reported upon later.

Meeting of Associated Health Authorities.—The eleventh annual meeting of the Associated Health Authorities and Sanitarians of Pennsylvania was held at Gettysburg, May 27 and 28. Two important topics considered were the registration of vital statistics and the securing of improved sanitary measures for the State. Dr. Cressy L. Wilbur, of the United States Census Bureau, delivered the annual address on the former topic. A committee was appointed to draft a bill providing for the appointment by the State Board of Officers and Deputy Officers of Health in each county; these are to be under the supervision of the State Board. This would carry with it the repeal of the act of 1889 which provided that school boards may organize as health boards. The working of this law has never been satisfactory. The following officers were unanimously elected: First Vice-President, Dr. S. P. Heilman, of Heilmantale; Second Vice-President, Dr. T. N. McKee, of Kittanning; Third Vice-President, Dr. R. S. Maison, of Chester; Treasurer, Dr. Jesse C. Green, of West Chester; Secretary, Dr. Wilbur R. Batt, of Philadelphia. The Governor of the State is *ex-officio* president.

CHICAGO.

Chicago Policlinic.—Plans have been decided on for the erection of a \$150,000 building for the Chicago Policlinic and Hospital at Oak Street and La Salle Avenue. The hospital will be equipped for one hundred patients. At present it is situated at Chicago Avenue, where it has been for eighteen years. The new hospital will be the only institution of its kind owned by physicians and not conducted for profit. Bonds for \$150,000 will be issued and work will be begun as soon as possible. Dr. Fernand Henrotin is President; Dr. R. D. MacArthur, Vice-President; Dr. John H. Chew, Treasurer, and Dr. M. L. Harris, Secretary.

University of Illinois Commencement Exercises.—A class of 219 was graduated from the College of Physicians and Surgeons, the Medical Department of the University of Illinois, May 24. Prof. Thomas J. Burrill, Vice-President of the University, conferred the degrees, and Rev. A. R. Lambert delivered the doctorate address.

Illness of Dr. Newman.—Dr. Henry P. Newman, Treasurer of the American Medical Association, was operated on for appendicitis May 21, and the appendix removed. It is said that he bore the operation well, and is progressing favorably toward recovery.

Reciprocity Convention.—The third annual convention of the American Confederation of Reciprocity, Examining and Licensing Medical Boards was held in Chicago, May 24. The Examining or Licensing Boards of the States of Illinois, Indiana, Wisconsin, Michigan, Iowa, Nebraska, Kentucky and Maryland were represented. The address of the President, Dr. W. A. Spurgeon, Muncie, Ind., dwelt on the insufficiency of the courses in the colleges and the lack of proper relation between the various branches. He advocated regulation of the medical college curricula, and of State Board questions as a basis for reciprocity and uniformity.

A Chief Predisposing Cause of Appendicitis; Preliminary Note, with a Few Laboratory Experiments.

—Dr. George Rubin, after reporting a case of this disease, detailed some experimental work. The technic was as follows: Portions of bowel, about 50 cm. long, including cecum and appendix, were resected from subjects dead of other diseases than what would affect that part of the intestinal tract. Specimens from very recent post mortems were more desirable, but were not always obtainable. After cleansing the piece of bowel, the colon end was ligated; shot, peas and beans were introduced through the ileum end and the bowel manipulated so as to indicate more or less peristalsis. The rolling of those bodies was often done with more vigor than normal peristalsis would do. It was observed that none of the contents entered the cavity, although the appendix was held at the most dependent point. Then the bowel was inflated, still containing those substances, the same process of rolling again gone through, with the result that in all the experiments, with one exception, where only one small shot entered, owing to a highly hypertrophied appendix wall and constricted lumen, the appendiceal cavity was filled with shot and in two cases peas of medium size gained entrance there. Ten such experiments were carried out. The appendix was readily ballooned during the process of inflation. It is reasonable to suppose, said the author, that similar phenomena might occur in the living. Fitz recorded 19 out of 267 cases of appendicitis which were supposed to be due to indirect violence. Such cases can only be explained in the following manner, that by forcing a larger mass of fecal matter through the ceco-appendicular orifice than the appendix is able to expel, following that trauma to the mucosa with subsequent infection taking

place. It is not improbable that heavy labor, such as heavy lifting, may operate in a similar manner, *i.e.*, owing to the increased intra-abdominal pressure produced by tension of the abdominal wall. These considerations help to explain the marked disproportion in the sexes. Regarding the size of the obstructing mass, no definite statement can be made. The calibers of appendices vary very much. What would be an insignificant particle for one may completely obstruct another. As to the rôle the valve of Gerlach plays in preventing matter from entering the appendix, little can be said, as in all the specimens of bowel the author has examined, in only one was there a lengthening of the mucosa that might have been called a valve. Under ordinary circumstances, the mucous lining itself is sufficient to act as such.

CANADA.

Personals.—Dr. C. R. Elliott, formerly resident physician at St. Michael's and the General Hospitals, Toronto, has been appointed by the United States Government surgeon at the marine hospital, Seattle.

Dr. J. W. Harris, resident physician at the Toronto General Hospital, has been appointed to the position of relieving physician to the Insane Asylums of Ontario.

Dr. C. E. Dougherty, the assistant medical superintendent of the hospital for the insane at New Westminster, B. C., has resigned and will become superintendent of the hospital at the mining camp of Ymir.

News from Queen's, Kingston, Ont.—At a meeting of the medical faculty of Queen's held on the 25th of May, it was decided that the matriculation standard of the Ontario Medical Council was high enough at present. A leading lawyer of Kingston will be appointed to give a series of lectures next session in connection with the subject of medical jurisprudence.

Dr. J. C. Connell, Dean of the Medical Faculty of Queen's University, has received word that Cambridge University would grant recognition to Queen's medical course. This means that Queen's medical students, after spending a session or two or three at Kingston, will have the privilege if they desire of going to Cambridge and completing their course there, full allowance being given for their attendance at Queen's.

New Appointments in the Faculty of Medicine at McGill.—At the last meeting of the Board of Governors of McGill University the following appointments were made in the Medical Faculty: Dr. R. Tait McKenzie to be lecturer in anatomy; Dr. A. A. Robertson to be lecturer in physiology; Dr. W. G. M. Rogers to be lecturer in ophthalmology; Dr. J. W. Scane to be lecturer in pharmacology and therapeutics; Dr. W. S. Morrow to be associate professor of physiology; Dr. A. G. Nichols to be associate professor of pathology and bacteriology.

Consumption Sanitaria in Canada.—At a meeting of the executive council of the Canadian Association for the Prevention of Tuberculosis, a committee consisting of Dr. P. H. Bryce, convener; Dr. J. D. Laferty, Calgary, N. W. T.; Dr. C. J. Fagan, Victoria, B. C.; Dr. Gordon Bell, Winnipeg, and several laymen was appointed to take steps to secure the cooperation of municipalities and of the governments of the several provinces and of the Government of the Dominion of Canada for the establishment of one large sanitarium in each province for the treatment of consumption. The secretary of the Association was instructed to visit Prince Edward Island, Nova Scotia and New Brunswick in August and September with a view to lecture upon the cause and prevention of consumption and to lecture in Ontario during June and July; and in addition a special committee was appointed of all members of the Association resident in Ottawa with Dr. H. B.

Small as convener to take steps to organize for the work in that city.

Nova Scotia's Consumption Sanitarium Opened.—The Province of Nova Scotia, by an Act passed March 30, 1900, appropriated a sum of money for the erection of a consumption sanitarium for tuberculous disease of the lungs. The institution has been declared formally opened, but will not receive patients until the first of July. This government sanitarium is situated about three-quarters of a mile from the town of Kentville, about seventy miles from Halifax. The building cost without furnishings \$20,000, and has accommodations for 20 patients. The Act provides that there shall be appointed two examining physicians and that both shall be residents of Halifax, but these have not as yet been selected. There will be no resident physician, but arrangements will be made whereby one of the physicians of Kentville will make frequent visits to the institution. In the meantime the institution will be under the charge of the lady superintendent who is a graduate of one of the Boston hospitals, and who has had special training in the Massachusetts State Sanitarium and in the Sharon Institution.

GENERAL.

Medical Interne.—Government Hospital for the Insane. The United States Civil Service Commission announces an examination on June 29-30, 1904, to secure eligibles from which to make certification to fill at least two vacancies in the position of medical interne in the Government Hospital for the Insane, Washington, D. C., at \$600 per annum each, and other similar vacancies as they may occur in that hospital. The examination will consist of the subjects mentioned below, valued as indicated:

<i>Subjects.</i>	<i>Weights.</i>
1. Letter-writing (the subject-matter on a topic relative to the practice of medicine).....	5
2. Anatomy and physiology (general questions on anatomy and physiology, and histologic or minute anatomy)	15
3. Chemistry, materia medica, and therapeutics (elementary questions in inorganic and organic chemistry; the physiological action and therapeutic uses and doses of drugs) ..	10
4. Surgery and surgical pathology (general surgery, surgical diagnosis; the pathology of surgical diseases)	20
5. General pathology and practice (the symptomatology, etiology, diagnosis, pathology, and treatment of disease).....	25
6. Bacteriology and hygiene (bacteriologic methods, especially those relating to diagnosis; the application of hygienic methods in prophylaxis and treatment).....	10
7. Obstetrics and gynecology (the general practice of obstetrics; diseases of women, their pathology, diagnosis, symptoms, and treatment, medical and surgical).....	15
Total	100

Age limit, twenty years or over. This examination is open to all citizens of the United States who comply with the requirements. Applicants must be graduates of reputable medical colleges. Applicants should at once apply either to the United States Civil Service Commission, Washington, D. C., or to the secretary of the local board of examiners at the places mentioned in application Form 1312. No application will be accepted unless properly executed and filed with the Commission at Washington prior to the hour of closing business on June 22, 1904. In

applying for this examination the exact title as given at the head of this announcement should be used in the application.

Rush Monument Dedication.—The Rush Monument Committee of the American Medical Association will unveil and dedicate the monument to Benjamin Rush, on Saturday, June 11, 1904, at 5 o'clock P.M., on the grounds of the Naval Museum of Hygiene and Medical School, Twenty-third and E streets, N. W., Washington, D. C. An introductory address by the president of the American Medical Association will be made and a eulogy of Rush by Dr. J. C. Wilson, of Philadelphia, delivered. An acceptance of the monument as a gift to the nation will be made by the President of the United States.

International Tuberculosis Congress.—The International Tuberculosis Congress was formally opened in Parliament House, Copenhagen, last Friday, under the presidency of Professor Brouardel, of Paris. Crown Prince Frederik, the Ministers and members of the Diplomatic Corps, including the United States Minister, Mr. Swenson, were among those in attendance. Delegates from twenty countries, among them Dr. Pottenger, of Los Angeles, Cal., and E. L. Trudeau, of New York, were present. The Premier, M. Deuntzer, welcomed the delegates.

The American Gynecological Society will meet next year at Niagara Falls. The officers elected for the ensuing year are: President, E. C. Dudley, Chicago; vice-presidents, H. D. Fry, Washington, and H. C. Coe, New York; treasurer, J. M. Baldy, Philadelphia; secretary, J. Riddle Goffe, New York. The society amended its constitution to read as follows: "The object of this Society shall be the promotion of knowledge in all that relates to diseases of women, to obstetrics and to abdominal surgery."

Walter Reed Memorial Association.—The Walter Reed Memorial Association has been incorporated under the General Laws of the District of Columbia, to give unity to the various proposals which have been made for the securing of a Memorial Fund. This Association is now organized for the collection and care of such sums as may be entrusted to it. Printed papers explanatory of the services of Major Reed, U.S.A., and respecting this Association are ready for distribution and will be sent to those who apply for them. Contributions from individuals, medical societies, boards of trade and other business organizations are now solicited. They may be sent to the treasurer, Charles J. Bell, American Security and Trust Company, Washington, D. C., by whom they will be acknowledged.

Kalamazoo Hospital.—On May 24 the corner-stone of the new Kalamazoo Hospital at Kalamazoo, Mich., was laid with appropriate ceremonies that were participated in by many of the prominent citizens of the town. Addresses were made by the Mayor, James W. Osborn, Rev. E. J. Blekkink, Dr. H. B. Osborne, Rev. W. M. Puffer, D.D., and Rev. H. W. Gelston, D.D. Music was rendered by a quartet, and at the close of the exercises the entire audience united in singing "America." The Kalamazoo Hospital is the result of four years hard work, and the laying of the corner-stone marks the reality of this much-needed addition to the beneficent institutions of the town. The money for the building has been raised by unceasing efforts of the women of the city, who united in one grand endeavor to secure this city hospital. Hundreds of contributions have been made, bazars, trolley-days, what-so-ever circles, and entertainments of other kinds have combined with the liberality of a few leading citizens in pro-

ducing the required sum of money. The building is to cost \$28,000, exclusive of the plumbing and heating, and the money has all been raised. The principal gifts were from Dr. Edwin H. Van Deusen, \$10,000; the estate of Horace B. Peck, \$5,000; the Woman's Auxiliary, \$8,025, and the remainder has been contributed by smaller subscriptions. When completed the hospital will have 40 beds. It is non-sectarian, open to all the citizens of the town as well as strangers, and with its sister institution, the Borgess Hospital, will furnish room for the care of all the sick and emergency cases of the city for a considerable time to come. The present officers of the association are Dr. W. E. Upjohn, President; Mrs. C. H. Williams, Vice-President; E. J. Phelps, Treasurer; Guy Van de Kreeke, Secretary.

Phi Chi Fraternity.—At the National Convention of the Phi Chi Fraternity (medical), held in Burlington, Vt., May 25, 1904, Dr. F. E. Clarke, Instructor of Histology and Pathology in the Medical Department of the University of Vermont, was elected Grand President. That evening the local, Alpha Chapter, gave a banquet to the visiting delegates and the members of the faculty at the Van Ness House; President Clarke acting as toastmaster. Among those present who responded to toasts were: Dr. A. O. J. Kelley, of Philadelphia, Pa.; Dr. A. R. Shands, of Washington, D. C.; Dr. H. C. Tinckham, Demonstrator of the Faculty of the Medical Department of the University of Vermont, and President Matthew Henry Buckham, of the University. The next national convention will be held in Baltimore, Md., some time in January, 1905.

Consumption from Cattle.—The royal commission, appointed in August, 1901, to investigate the connection between human and animal tuberculosis, has reached certain conclusions embodied in an *ad interim* report, which in effect refutes Prof. Koch's much discussed theory that tuberculosis cannot be communicated by animals to human beings. The commissioners attacked the problem experimentally instead of beginning by collecting opinions, and their main conclusion is thus expressed: "We have most carefully compared the tuberculosis set up in bovine animals by materials of human origin with that set up in bovine animals by material of bovine origin, and so far have found the one, both in its broad general features and in its finer histological details, identical with the other. Our records contain accounts of post-mortem examinations of bovine animals infected with the tuberculosis material of human beings which might be used as typical descriptions of ordinary bovine tuberculosis." This, in the judgment of the commissioners, "seems to show quite clearly that it would be very unwise to frame or modify legislative measures in accordance with the view that human and bovine tubercle bacilli are specifically different and that the disease caused by one is wholly different from the disease caused by the other." The commissioners experimented with more than two hundred bovine animals. Their present conclusions, which will be followed by a further report, strikingly support the view of a majority of English medical men and are likely to lead to a strengthening of the regulations regarding the sale of meat and milk.

OBITUARY.

Dr. RALPH N. ISHAM, for nearly half a century one of the leading physicians of Chicago, died last week at the home of his daughter, at Lake Forest, Ill.

Dr. THOMAS MURRAY DRYSDALE, the well-known gynecologist, is dead at the age of seventy-three years. He was born and educated in Philadelphia and practised there except during the time he was in the Civil War.

Dr. Drysdale held various teaching and honorary positions and was prominent in his specialty.

Dr. F. SAVARY PEARCE, Professor of Neurology at the Medico-Chirurgical College, Philadelphia, died at the home of his father in Steubenville, Ohio, May 27, at the age of thirty-seven years. Excessive application to work, especially in the preparation of text-books, led to a breakdown that ultimately resulted in death. Dr. Pearce graduated from the University of Pennsylvania in 1891 and had been connected with the Medico-Chirurgical College for four years.

SPECIAL ARTICLE.

BYWAYS OF MEDICAL LITERATURE.—XXI.

PROTOZOA AND DISEASE.

In the April number of the *Century Magazine*, Dr. Gary Calkins, Adjunct Professor of Zoology at Columbia University, has an excellent article on the etiological connection between certain forms of protozoa and infectious diseases in human beings, that while popularly interesting is thoroughly scientific. At the present time it must be recalled that some of the most important diseases that afflict mankind, among them some whose cause has longest remained a mystery, are either known to be due to protozoa, or, at least, the causes of these diseases are suspected to be of protozoan character. Malaria is surely due to a protozoon, or perhaps to several forms of protozoa, whose life history has now been worked out. Discoveries made last winter by Dr. F. B. Mallory, of Boston, seem to point surely to the fact that scarlet fever is also due to a protozoon. It is more than suspected now that yellow fever is due to the same form of parasite, and the analogy with malaria, because of the mosquito distribution, confirms this very strongly. It is easily seen then how important these microorganisms are. Two paragraphs from the beginning of Prof. Calkins' article give a very good idea of the place in nature of the protozoa:

"Since Pasteur demonstrated the fact that many human diseases are due to minute living things which grow and multiply in our bodies, there has been a tendency to call all microscopic organisms, whether harmful or not, 'germs' or 'microbes' or 'bacteria' indiscriminately. This confusion may be cleared by the statement that protozoa are the lowest known forms of animals and that bacteria are the lowest known forms of plants, while 'germs' and 'microbes' may apply to the disease-causing forms in either group.

"Protozoa are higher in the scale of living things than bacteria, their structures are far more complicated and their methods of living more complex, while most of them far surpass the bacteria in size, some, indeed, being visible to the naked eye. Like most bacteria, the majority of protozoa are absolutely harmless; but, unlike others (those that aid us in the digesting of our food, for example), no protozoa do us good except in the very general way of helping to maintain what is known as the 'balance of nature.'"

With regard to the etiological connection between protozoa and human diseases the first step was, of course, Laveran's discovery of the malarial organism. The connection of protozoa with smallpox has been suspected for at least as long a period as that, but the first step of demonstration was made in Italy. To quote Prof. Gary once more:

"As early as 1892 an Italian, Guarnieri, discovered a protozoon in vaccinated skin and the same protozoon in skin from smallpox patients. Guarnieri named the organism *Cytoryctes variolæ* and described it as the cause

of smallpox. Neither he nor subsequent observers went further than this, and, until Dr. Councilman discovered them last spring, the most important stages in the life of the germ were overlooked. The stages of reproduction to which the virulence of smallpox must be attributed were made known by this discovery, and Councilman was able to give the very important generalization that vaccinia, or the mild disorder caused by vaccination, is due to the presence of the organism in the cell bodies of the human skin, while the more virulent disease, smallpox, is due to the presence of the same organism in the nuclei of these cells as well as in the cell-bodies."

While Prof. Calkins' illustrations give an excellent idea of certain stages of the protozoa which resemble the smallpox germ very closely he confesses that:

"It is not possible to describe the smallpox germ so as to convey an intelligible idea of its appearance. It has no definite form, but, like the free-living organism *Amaba proteus*, it constantly changes in shape. The reproductive bodies in the non-sexual phase are minute solid spheres, hardly visible when not in groups. The spores, which probably convey the disease from person to person, are equally minute, but differ from the former bodies by the presence of vesicles which occupy the greater part of the spores. This vesicle is characteristic of the entire group of *Microsporidia* in which *Cytoryctes* belongs, and it is probably an important element of the spore, for it reduces weight and renders it light enough to be wafted about by the lightest breath.

"Our knowledge of the smallpox organism is as yet very incomplete, and further experiments and study must be undertaken before it will be as clearly understood as are the organisms of malaria. The method of transmitting the disease from man to man, and the location of the parasite when outside of man, are quite unknown, but we are fortunate in the knowledge that the disease can be prevented by vaccination, the organism being injected into the skin-cells, where it undergoes a limited development and never grows into the destructive phase whereby the cells and nuclei of the skin are wrecked. The secret of this limitation is unknown, and it, together with the general problem of the immunity conferred by vaccination, remains for the future to solve.

"The discoveries of the protozoan parasites of malaria, smallpox, scarlet fever, and yellow fever should stimulate pathologists and biologists to a renewed study of other diseases in which the specific causes are unknown. Such study must lead to the further relief of human suffering, for as vaccination produces some slight change which makes the system unsuitable for growth of the smallpox organism, or as warfare on the mosquito limits the spread of yellow fever and malaria, so preventive or remedial measures will follow future observations and discoveries, and it is not too Utopian to believe that, before long, some comparatively simple means may be found to prevent or to cure diseases like scarlet fever or even cancer."

THE ATOMIC THEORY OF MATTER AGAIN.

Physicians generally are sufficiently interested in chemistry and chemical theory to have kept themselves to a considerable extent, at least, familiar with recent progress, real or supposed, as to the chemical and physical explanations of the constitution of matter. So much of the ordinary scientific journal has in very recent years been taken up with discussion of the ionic theory of the constitution of matter, that is, the theory which postulates ions (atoms) charged with certain dynamic principles, probably electrical in character, as the basis of matter, that the impression is apt to have

been produced that the old atomic theory of the constitution of matter had gone out entirely. This, however, is far from being true, and some recent publications, especially from the pen of Mendeleev, show that the atomic theory may still prove quite as vital as the newer ionic theory.

Mendeleev will be remembered as the distinguished Russian chemist who first showed the law of periodicity in atomic weight. About a quarter of a century ago or more this law proved very illuminating for chemistry and even pointed out the probable existence of certain elements as yet undiscovered which later were actually discovered. Mendeleev's law, as the application of his principle of periodicity came to be called, also proved very valuable as regards the relationship between the various elements and their action and reaction upon one another. It was even thought at one time that this law might be of use in the explanation of the physiological action of elementary substances, at least upon the body, and that its application might prove the basis for a system of rational therapeutics, as opposed to our present system of empiric therapeutics. Unfortunately this hope was never realized. Drug action upon the human or animal body is entirely too complex a matter to be explained by any mere chemical principle.

In a recent issue of *Prometheus*, a well-known continental journal of chemical science, Mendeleev has given a chemical explanation of the ether, and in doing so has also attempted to explain the radio-activity. As it is principally the phenomena of radio-activity which have proved most difficult of explanation on the old atomic theory, his words are of great interest. Besides, the ether itself as a substance which, according to the theory of the wave transmission of light, must be more elastic than steel, and yet is so tenuous as to penetrate all other substances, has had for many minds a mysterious aspect that made them think of it as something rather demanded as a part of a working hypothesis than as an actually existent material. It is not as such that Mendeleev treats it. We quote his expressions as they are given in *Science*, Vol. 19, No. 479, 1904:

"It cannot consist of matter known, disseminated in an exceedingly attenuated condition, because it penetrates all matter, nor can it be the 'Urstoff' (primal matter, original material) since this would involve the possibility of the annihilation and evolution of atoms. It must rather be considered as a definite chemical substance so light that its molecular velocity is great enough to overcome gravitation; it is without chemical affinity; its power of diffusion is so great that it can penetrate all bodies, and hence cannot be weighed, although it actually possesses an extremely small weight. Mendeleev would thus consider the ether to be the first member of the argon group in the periodic system, or what he calls the zero group, and places immediately before the alkali group. By extrapolation he posits an element in this group immediately before hydrogen, with an atomic weight of about 0.4. This he considers possibly identical with coronium. The ether must have a still smaller atomic weight, whose value, owing to this double extrapolation, is extremely doubtful, but certainly cannot be over 0.17. For this ether as an element he proposes the name of β Newtonium. That the ether molecule can escape the attraction of the larger bodies of the universe its velocity must be, according to the kinetic theory of gases, at least 2,240 kilometers per second, and from this its atomic weight would be about one millionth that of hydrogen.

"By means of this conception it becomes possible to account for radio-activity without having recourse to what Mendeleev denominates the metachemical and vague theory of electrons. The radio-active atoms, with

their high atomic weights, possess, as large centers of mass, the power of holding a relatively large number of ether atoms, although there is no chemical combination. The entrance and exit of these ether molecules from the groups are accompanied by those disturbances of the ethereal medium which cause the rays of light. The phosphorescence of bodies immersed in liquid air is caused by the increased absorption and condensation of ether molecules at low temperatures. The original article contains many other suggestive thoughts, such as the probability of a fifth halogen element, with atomic weight of about three, corresponding to the fifth metal of the alkalies."

This other side of the question of radio-activity and its explanation makes clear how little is really known of these phenomena, which have lately attracted so much attention by both chemists and physicists. It also serves to show the futility of hopes of wonderful curative properties founded upon radio-active materials. As a matter of fact radio-activity is not so uncommon as has been thought, and it is probable that we have been taking into our systems much radio-active material without at all realizing it and without our ordinary metabolism being at all affected by it. Unfortunately, however, whenever there is anything new discovered there will always be those to cry out on the market place that at last the great secret has come and that the mysteries of health and disease are to be obscure no more.

PRACTITIONER.

A very dear old friend of one of the contributors to these Byways asked the other day on what principle was the word practitioner so commonly used as a synonym for physician. The word practitioner has something of a shady meaning among lawyers, implying that its bearer is perhaps not much more than a pettifogger. Is there not at least a shade of this meaning in the word practitioner as applied to a medical man also, and should not the full expression always be used—practitioner of medicine? Long ago, so long that the present generation is not likely to remember much about it, that delightful critic of English, Mr. Richard Grant White, called attention in his "Words and Their Uses," a book which has gone through some seventeen or even more editions, had something to say with regard to this word practitioner.

It is in the chapter on words that are not words in the original edition and runs thus: "Practitioner is an unlovely intruder, which has slipped into the English language through the physician's gate. We have no word *practition* to be made a noun of agency by the suffix *er* or *ist*. But either practitioner or practitionerist means only one who practises, a practiser. Physicians speak of their practice, and of the practice of medicine, and in the next breath call a medical man a practitioner. The dictionary-makers give practice as the stem of practitioner—it is difficult to see why. The word is evidently the French *praticien*, which has been anglicized first by distortion, and then by an incongruous addition, in the hope of attaining what was unattainable—a word meaning something bigger and finer than is meant by the simple and correct form practiser."

In one of the subsequent editions of his work Mr. Richard Grant White returns to the word, showing some of the unsavory estimations of it, that it would perhaps be well for medical writers to know who insist on using the term. He says:

"The word practitioner, which has already been remarked upon as abnormal and indefensible, also affords an illustration of the point under discussion. It is not a new word, its use dating back at least three hundred years. Bishop Latimer, according to Richardson, uses

it in his sermon on the Lord's Prayer, applying it to Satan: 'Consider how long he hath bin a practitioner;' and I find it in 'The Gardener's Labyrinth' (Ed. 1586), more than once. For example: 'Sundrie practitioners mixed the bruised leaves of the cypress tree,' etc. (p. 32). We have legitimate words with which the formation of this one seems to be analogous. Wicliffe writes, 'For how manye weren possessioneris of feldis,' etc., and Sidney, 'Having been of old freedmen and possessioners.' I venture to say that Wicliffe and Sidney might much better have written possessors; but still there is a noun possession from which possessioner may be properly formed. So from redemption we have redemptioner, and from probation, probationer. But there is no noun practitioner, from which to form practitioner, and, therefore, even Latimer cannot make it a normal product of our language. As to my conjecture that it was formed in imitation of the French practitioner, I have since found the following interesting and confirmatory passage in Stephen's 'World of Wonders' (A.D. 1616):

"What reason is it then that Lawyers should make them such good sport for nothing? Or that they should be weary of taking before they be weary of giving? And I am easily induced to thinke, that when they were called Pragmaticiens, that is Pragmatitioners (by the original word), things were not so out of square; but since that a sillable of their name, was clipped away, and they called Practiciens, that is, Practitioners, they knew well how to make themselves amends for this curtailing of their name, as well upon their purses who were not in fault, as upon theirs who were the authors thereof" (p. 129).

All of which goes to show that the term practitioner, unqualified, has always been in bad odor and that when used seriously as a synonym for physician, which is quite a good enough word for most people, the adjective medical should be added to it so as to avoid any of the innuendos that otherwise might go with its unqualified employment.

RATIONAL AND EMPIRIC USE OF DRUGS.

Some of Sir William Gowers' remarks with regard to the employment of drugs on rational grounds or for empiric reasons only, represents so well the truth in this important matter and at the same time are so full of information of a kind not easily obtained that every physician should have them in his scrap book. They were published in the recent volume of clinical lectures, published in this country by Blakiston, and were reviewed in the *MEDICAL NEWS* a short time ago:

"The term 'rational therapeutics' is applied to treatment in which a drug is given with success in accordance with preconceived ideas or theory. The theory may turn out quite wrong, although the result is the same. What, then, becomes of the rationality? In empirical therapeutics a drug is given because it is found by experience that in the particular condition it does good. Often we cannot even guess why. But the fact remains, and surely to act upon observed experience is as truly a rational proceeding as is action upon a theory which may be correct or incorrect. After all, the medicinal treatment which can be based upon any definite theory is small. How few are the drugs we can use to advantage which were not discovered by pure experience. In not one drug in twenty of those of most certain service can the use be traced to anything except unguided experiment. Our knowledge of these drugs, derived from the past,—and often from the distant past,—must be assumed to be the result of experiments innumerable, or perhaps continued through the long centuries in which the human race has lived

under the need to counteract disease by every available means. The need for food must itself have led to a knowledge of the physiological action of most herbs of the field, and the habits of animals under observation may often have had the force of example. It is probable that since man became able to observe and to reason, every common herb of the field and fruit of the tree has been at some time tested, and thus by slow degrees the knowledge of a physical good and evil has been acquired.

"It is strange, indeed, to note how far back goes the use of the drugs on which we most rely. Most of them can be traced back into the distant past until they are lost in the blue mists which shroud alike the hills of Greece and the deserts of Arabia, or to the time when the world learnt its wisdom from the land where not the symbols of man's thought lie deep beneath the desert sand or stand silent in the cold moonlight of a long dead past. We smile at the popular herbal remedies. But it is to these that we owe the majority of our most useful drugs. I cannot conceive a therapist surveying a list of the chief drugs on which we depend in our daily work—and do not depend in vain—without a sense of wonder and perhaps of humiliation. We disinfect out our rooms with burning sulphur; and so men did before the time of Homer. We purge sometimes with rhubarb, especially when some subsequent astringent influence is desirable, and so did the old Arabians for the same special reason. The value of castor oil in its chief use was familiar, probably for ages, to the natives of the East and of the West Indies before it was made known in Europe by a physician from Antigua, one hundred and fifty years ago. Aloe was employed in the same way long before the time of Dioscorides and Pliny. The knowledge of the influence of ergot in parturition we owe to the peasants of Germany, and the use of male-fern for tapeworm goes back to the old Greeks and Romans. The employment of mercury in syphilis by inunction and fumigation, which our nineteenth-century therapeutists regard with such satisfaction, seems to go back to the time of the Crusades, and it is said that its use can be traced in Malabar as far back as the ninth century. Podophyllum as a purgative we owe to the North American Indians. If we go through all the drugs on which we most rely we find the same story. Even in the case of those which are the latest additions to our resources, we find that, with very few exceptions, their use arose from what we must regard as pure empiricism. It was by accident that the local anesthetic influence of cocaine was discovered. The unexpected results of a simple experiment afforded us the chief use of antipyrin; and that which is perhaps the greatest practical discovery of modern times in the influence of drugs on disease—the use of bromides in epilepsy—was the result of a chance observation of its use on an allied state—also empirical. Precisely the same treatment is true regarding the employment of iodide in syphilis. It arose from almost random trial of the influence of burnt sponge on goiter. To this day we are without any rational perception of their mode of action. I yield to no one in my sense of the importance of the rational in therapeutics; but we need to be careful lest, in contrasting the rational and the empirical, we allow our esteem for the one to induce a depreciation of the other. We can afford to despise no source or kind of help, nor to permit our estimate to be prejudiced by the many warping influences to which our thought is liable.

"Any attempt to frame a definition of rational therapeutics will, I think, have one effect. It can hardly fail to raise a doubt as to the propriety of considering that a theory to explain an empirical discovery makes the

therapeutics rational. It is very easy to frame a theory of the action of a drug, and it is easy to extend this theory to the nature of the disease in which the drug does good, and at the same time to ignore the many other possible ways in which the effect may be produced, and so to build from an uncertain foundation an edifice altogether unstable. When I recommend a drug I am often asked 'How does it act?' Occasionally I can give some adequate reason, but I am generally compelled to answer, 'I do not know; it is often useful in this condition.' Sometimes I can add, 'There are several ways in which it may act.' Sometimes I am obliged to say, 'I have no idea how it does good.' It has not been my privilege to add much to our therapeutical resources, but the few agents I have recommended have been based on pure empiricism. Many observers have confirmed the statement which I made more than twenty years ago regarding the occasional service of borax in epilepsy. In inveterate cases, which do not yield to bromide, borax sometimes does good that is definite and distinctly greater than that which bromide produced in those patients. But I cannot say why. It was one of the many things I tried, simply as a peasant might try in succession a number of herbs. Further, the diminution in the tendency to the distressing pains in locomotor ataxia, which is caused by the regular administration of chloride of aluminum, is so distinct that I have little doubt that the time will come when this drug will find a place in the Pharmacopœia. But I had no other reason for trying it than the fact that some analogue suggested it. Of the rational we have here no trace, although I should take exception to the difference involved in the application of the epithet 'irrational.'

A DECALOGUE OF HEALTH.

There are many expressions of older physicians that deserve a permanent place in the scrapbooks of modern general practitioners of medicine, where they would often be seen in order to recall some of the important principles that clinical experience has shown to be of special value. Among these one of the most deserving of a prominent place are the ten good rules of health which were formulated by Dr. Frank H. Hamilton, the distinguished New York surgeon, who was in no sense a narrow specialist, and whose large-minded view of things medical makes his opinion of special importance. He called these rules a decalogue of health, and now that interest very generally is being awakened and the important problem of maintaining health by physical culture and habits that aid nature in her effort to preserve health, the reprinting of them will show that the modern fad, in as far as it does not go into exaggeration, is not something new, but agrees with common-sense opinions of physicians in every generation.

Here then is Dr. Hamilton's Decalogue of Health:

1. The best thing for the inside of a man is the outside of a horse.
2. Blessed is he who invented sleep—but thrice blessed the man who will invent a cure for thinking.
3. Light gives a bronzed or tan color to the skin; but where it uproots the lily it plants the rose.
4. The lives of most men are in their own hands, and, as a rule, the just verdict after death would be—*felo de se*—took his own life.
5. Health must be earned—it can seldom be bought.
6. A change of air is less valuable than a change of scene. The air is changed every time the wind is changed.
7. Mold and decaying vegetables in a cellar weave shrouds for the upper chambers.
8. Dirt, debauchery, disease and death are successive links in the same chain.

9. Calisthenics may be very genteel, and romping very ungenteel, but one is the shadow, the other the substance, of healthful exercise.

10. Girls need health as much—nay, more than boys. They can only obtain it as boys do by running, tumbling—by all sorts of innocent vagrancy. At least once a day girls should have their halters taken off, the bars let down, and be turned loose like young colts.

IBSEN AND PSYCHOPATHOLOGY.

Those who are interested in theatrical psychics had another opportunity in the presentation of Ibsen's drama of *Rosmersholm* by the Century players to see how well the Norwegian dramatist is able to put psychopathological conditions into dramatic form. The story is a comparatively simple one, the climax of dramatic action being brought about by a dominant idea, an obsession that finally works itself in the lives of those who live in the constant presence of the overmastering thought of the suicide of the wife from a bridge that can be seen from the window of the house. Beata, the wife, evidently of not very strong mind, in fact, generally believed to be of less than normal mental powers, in a mingled fit of jealousy and supposed good-will toward her husband, so as to enable him to marry the woman whom she considers he loves, commits suicide. The idea of this death falls like a pall over the old gloomy house, whose possessors have always been of rather melancholy disposition, and it is not lifted by the determined efforts of the nurse whose presence has been the cause of the wife's suicide.

On the contrary, it brings out very clearly what so frequently happens—the influence of a psychic contagion, which finally influences the mind of the nurse and leads her to agree to commit suicide at the suggestion of the husband, who accompanies her to her death. From the very beginning one feels how well Ibsen has realized the power of such a dominant idea, especially with the scene of the death always in view from the drawing room window, and the constant reminder of the awful cloud that hangs over the house. Specialists in mental diseases know how much of influence for evil such an obsession may have and how it may pervert the best intentions and keep people from getting interested in their lifework rather than in this dominant melancholic idea that is so insistently in their lives.

It is a study in pathological psychology that Ibsen has put upon the stage in *Rosmersholm*. It bears a curious resemblance, which Mr. Huneker pointed out in a recent number of the *Sun*, to the old tragedies of the Greeks, with stern fate and inevitable necessity always in the background of the picture. Mr. Huneker says:

"The protagonist of *Rosmersholm*, is Beata. She is seldom long absent from each of the four acts. She peers over the edges of the dialogue, and in every pause one feels her unseen presence. An appalling figure this drowned wife, with her staring, fish-like eyes! She revenges herself on the living in the haunted brain of her wretched husband, and she exasperates Rebecca, slowly wearing away her opposition until the doleful catastrophe. There is something both Greek and Gothic in this spectral fury, this disquieting Ligeia of the mill-dam.

"We find the old hero and heroine obsessed by fate, replaced by this neuroathenic pair. The antique convention is altered, ancient values depreciated. A hero is no longer interesting or heroic; the heroine, a criminal, is no longer sympathetic. Yet we are enthralled by this sinister spectacle, for if cultivated man disdains the crude dramatic pictures of lust and cruelty admired of his ancestors, he, nevertheless, hankers after tragedy. And it is for the modern that Ibsen has devised a tragic, ironic drama of the soul. In doing this the

dramatist is the slave of his own epoch, for to quote Goethe again, a genius is in touch with his century only by virtue of his defects; he, too, must be an accomplice of his times."

Ibsen is perhaps not to be blamed for presenting with such wonderful dramatic force studies of real life. We would not for an instant consider that he is in any way to be identified with his creations. There is real genius in them. It seems very doubtful, however, whether any good can ever be accomplished by such work, and whether, on the contrary, it may not even be a source of harm to the neurotically inclined, who are most apt to be interested in Ibsen. The very feeling of the all-powerful influence of an imperative idea, as brought out in such a play as *Rosmersholm*, is apt to weaken whatever inhibitory control is yet alive in neurotic natures and make them feel their inadequacy to control the course of what must seem to them as inevitable nature.

MEDICAL BOOKS POPULAR 200 YEARS AGO.

Books Printed for and Sold by William Innys, at the Prince's-Arms in St. Paul's Church-Yard. London.

Anthropologia Nova: or a New System of Anatomy, describing the Animal Economy, and a short Rationale of many Distempers incident to Human Bodies, illustrated with above 80 Figures drawn after the life; and to every Chapter a *Syllabus* of the Parts, described for the Orstruction of young Anatomists, by James Drake, M.D. In 2 Vols. 8vo.

The Anatomy of Human Bodies; with Figures drawn after the life, by some of the best Masters of Europe, and curiously engraved in 114 Copper-Plates. By William Cowper, Oxford. Printed at the Theater, on large imperial paper, in Folio.

Pharmacopœia Extemporanea: or a Body of Prescripts, in which Forms of Select Remedies accommodated to most Intentions of Cure, usually occurring in Practice; together with Virtues, Reasons of Operation, Rules, Cautions, Practical Observations, Manner of giving Doses, a Catalogue of Medicines and Copious Index, are proposed for the Assistance of young Physicians. Done into English out of Latin, by the Author. Theo. Fuller, M.D., with large additions. 8vo, 1710.

An Essay concerning the Knowledge and Cure of most Diseases afflicting Human Bodies. To which is annex'd a short Account of Salivation and the Use of Mercury. By P. Paxton, M.D., 8vo, 1711.

The History of Cold Bathing, both Ancient and Modern, in two Parts, by Sir John Floyer, of Litchfield, Kt., and Edward Baynard, M.D. The Third Edition, with large Additions, 8vo, 1709.

Præxia Medica: The Practice of Physick; or Dr. Sydenham's *Proceffus Integri*, translated out of Latin into English, with large Annotations, Etc., and various methods of Curing the Clap, Running of the Reins, French Pox, Etc. The Second Edition, enlarged throughout with some thousands of Additions, not in the former Impression. By William Salmon, M.D., 8vo, 1707.

Pharmacopœia Bateana: Or, Bate's Dispensatory, translated from the last Edition of the Latin Copy, Containing his choice and select Recipes, The *Arcana Goddardiana*, Etc. The Fourth Edition. By W. Salmon, M.D., 8vo, 1813.

Pthisiologia: or, a Treatise of Consumption, wherein the Difference, Nature, Causes, Signs, and Cure of all sorts of Consumption are explained. By Richard Morton, M.D.

The Anatomy of the Brain, containing its Mechanism and Physiology. By Dr. H. Ridley, in 8vo.

D. Guil. Cole Nova Hypothesis ad explicanda Februm intermittentium Symptomata, 8vo.

Gualt. Harris, M.D. *Morbis Acutis Infantum*. 2nd Ed. 8vo, 1705.

Three *Physico-Theological* Discourses, concerning (1) The Primitive Chaos and Creation of the World. (2) The General Deluge, its Causes and Effects. (3) The Dissolution of the World, and General Conflagration. 8vo.

The Wisdom of God manifested in the works of Creation, in two Parts, viz., The Heavenly Bodies, Elements, Meteors, Fossils, Vegetables, Animals (Beasts, Birds, Fishes and Insects), more particularly in the body of the Earth, its Figure, Motion and Consistency, and in the admirable Structure of the Bodies of Man, and other Animals, as also in their Generation, etc., with Answers to some Objections. 5th Ed. Very much enlarged. 8vo, 1709.

Medical Experiments: Or a Collection of Choice and Safe Remedies, Very useful for Families, and fitted for the Use of Country People. By the Honourable Robert Boyle, Esq. 4th Ed. Enlarged with a Supplement, 12mo.

Of the Reconcilableness of Specific Medicines to the Corpuscular Philosophy. To which is added a Discourse about the Advantages of the Use of simple Medicines. By Robert Boyle, Esq. 8vo.

Short Memoirs for the Natural, Experimental History of Mineral Waters. By Robert Boyle, Esq. 8vo.

Blancardi Opera Medica, Theoretica, Practica and Chirurgica, 2 vols. 4to. With Illustrations.

Hippocratis and Galeni Opera Grae. Lat. 13 Vol. Fol. Paris.

Plumier Description of Plants of America.

SOCIETY PROCEEDINGS.

AMERICAN GYNECOLOGICAL SOCIETY.

Twenty-Ninth Annual Meeting, held in Boston, Mass., May 24, 25 and 26, 1904.

FIRST DAY—MAY 24TH.

The Society met in the Boston Medical Library under the Presidency of Dr. Edward Reynolds, of Boston.

Address of Welcome.—An address of welcome was delivered by Dr. Charles M. Green, of Boston, which was responded to by Dr. Henry T. Byford, of Chicago.

The Treatment of Gall-stones Found as a Coincidence in Abdominal or Pelvic Operations.—Dr. John G. Clark, of Philadelphia, stated that among the unsettled questions in abdominal surgery, the treatment of gall-stones found as a coincidence in abdominal or pelvic operations might be considered a debatable one. He followed the plan at present of removing gall-stones which were found in the course of another operation, if the patient's condition permitted of this extra operation. Although it was stated that 95 per cent. of gall-stones produced no symptoms, he believed that this statement should not be applied to cases as one met with them at the time of an operation. In his review of recent literature he had been especially impressed with the fact that knowledge of the early stages of cholelithiasis was very indefinite, and that many cases which came to operation for more or less urgent symptoms did not have the clinical symptoms of colic and jaundice, as usually taught in medical schools. In view of this hiatus in the early history of this disease, he believed that many symptoms now attributed to gastralgia, indigestion, functional disturbances of the gastro-intestinal tract, etc., would, as knowledge increased, be ascribed to the presence of gall-stones with associated infection, which was so frequently found in cholelithiasis. In referring to the

etiology of gall-stones, he said that three facts had been prominently established: (1) That the bile was not bactericidal. (2) That the microorganisms in the gall-bladder were predisposing, if not absolute, causative factors in the formation of gall-stones. (3) When gall-stones were present in the gall-bladder, infection in that viscus was much more likely to take place. He mentioned three general avenues through which infection might enter the gall-bladder. (1) From bacteria circulating in the genital blood stream and reaching the liver through the hepatic veins; (2) by the direct passage of bacteria into the common bile duct from the duodenum; (3) by the transportation of bacteria from the intestine through the portal circulation. He then recurred to the frequently quoted statement that 95 per cent. of gall-stones did not produce symptoms, and showed from his own series of cases that in at least 50 per cent. there were varying symptoms from undoubted attacks of colic and jaundice to less pronounced gastro-intestinal symptoms. To justify operative intervention in cases which were not producing well-defined symptoms, the mortality and morbidity should be very low. In his own experience no death had occurred, nor had there been any serious complication referable to the secondary operation. In lieu of the fact that the additional operation did not seriously jeopardize the life of the patient, and also because he had seen two patients die from cholelithiasis a year or more subsequent to an abdominal operation, in which, had the routine exploration been made, the gall-stones might have been easily removed, he believed that the best interests of the patient would be conserved if the gall-stones were removed as a secondary part of another operation, in the event of their being found. He appended the history of 12 cases to his paper, in which the various operative points, as well as the significant facts in symptomatology were elaborated.

Kolalin.—Dr. R. Stansbury Sutton, of Pittsburg, said that gall-stones did not always produce symptoms which demanded or justified resort to operation. If they were encountered during the course of another operation, they had better be removed. There was a remedy, however, which obviated the necessity, in some instances, of surgical intervention, namely, kolalin. He had used kolalin in dozens of cases in which he had held operation in abeyance, and did not have to operate subsequently.

Dr. George M. Edebohl, of New York, had occasion at one time to operate on a woman who presented marked dyspeptic symptoms. In addition, she had movable kidney, chronic appendicitis, and induration in the region of the gall-bladder. He anchored the kidney, removed the appendix through a lumbar incision, pulled the gall-bladder into the lumbar wound, and found the stone about 4 or 5 cm. in length, pear-shaped, and nearly filling the gall-bladder. The attending physician was positive that the gall-bladder did not produce symptoms of stone in it. He would not let him remove the stone from the gall-bladder. A year later he opened the woman's abdomen for some other condition, making an incision near the gall-bladder. He investigated the gall-bladder, found it was perfectly healthy, and that the large stone had either passed or had been dissolved. The treatment after the previous operation consisted of the use of olive oil for about a month, and whether this had anything to do with the passage of the stone, he did not know. At any rate, the stone had disappeared and had left no trace of its former existence.

Dr. A. Palmer Dudley, of New York, emphasized the importance of looking beyond the gall-bladder for trouble. He believed that stones were formed in the

liver ducts themselves, and that from a stagnant circulation cholesterol nuclei formed, and that only a small proportion of stones were found in the gall-bladder. He would not hesitate to go into the center of the liver. In fact, in the last case he had, in which the diagnosis of gall-stones had been made by a medical confrere, he boldly went into the gall-bladder, but found no stone. He found the duct dilated; he went five inches into the right lobe of the liver, as far as he could reach with his finger, and packed the liver full with iodoform gauze, put an apron of gauze over it, and the patient was well to-day. He would explore the center of the liver in searching for such deposits.

Dr. Brooks H. Wells, of New York, said that in the last few years he had used practically the same measures as those outlined by the essayist. A number of patients coming under his observation had complained of obscure symptoms, of so-called functional indigestion. In them he found either disease of the gall-bladder, an over-distended gall-bladder from obstruction elsewhere, or trouble referable to gall-stones. By making a small or large incision, as seemed necessary, cleaning out the gall-bladder and draining it, the patients had obtained remarkable relief from the symptoms that were supposed to be due to functional indigestion.

Dr. Seth C. Gordon, of Portland, Me., said that when the abdominal cavity was opened for other purposes, and he was quite sure the patient could stand it, he would examine the gall-bladder thoroughly, and if gall-stones were found, he would remove them. He cited cases in support of this line of reasoning.

Dr. Hiram N. Vineberg, of New York, said that under the influence of the teaching of Kelly he had been in the habit of doing what had been advocated by the essayist, but after hearing a discussion on gall-stones in the common duct and in the gall-bladder by one of the Mayos, he had changed his method. Simply opening the gall-bladder and removing the stones did not effect a cure, as proven by three or four cases that occurred in his own practice. If the gall-bladder was diseased, however, it should be removed.

Dr. J. M. Baldy, of Philadelphia, said that gall-stones existed in the gall-bladder for years without causing any material discomfort, but that when infection occurred they were liable to give trouble. There was not the slightest question but what large numbers of cases of so-called stomach trouble, or chronic indigestion, sooner or later proved to be cases of gall-stones or of gall-bladder disease. With reference to removing gall-stones when operating for some other intraabdominal condition, the surgeon should consider the physical condition of the patient, the surroundings, etc., and as to whether the patient was willing to undergo the additional risk of a second incision for the gall-bladder operation.

Dr. Walter P. Manton, of Detroit, quoted Ochsner as saying that he had tried almost everything in the so-called cases of chronic dyspepsia, without affording relief; yet after opening their gall-bladders and removing gall-stones which were found, the patients were cured. Dr. Manton had seen a number of such cases, and contended that the removal of gall-stones, or the gall-bladder, if diseased, was the thing to do. He did not believe there was any solvent ever invented which would dissolve gall-stones.

Dr. Beverly MacMonagle, of San Francisco, Cal., stated that when the abdomen was opened for some pelvic or abdominal trouble, the operator should investigate the gall-bladder. If gall-stones had been making the patient ill, causing dyspepsia, or if there were adhesions around the gall-bladder, one should operate.

The conditions that arose in the pancreas as a consequence of gall-bladder disease and of gall-stones were serious, and if the surgeon could do something of a prophylactic nature, without adding to the risk of the patient's life, it was a wise thing to do.

Dr. Clark, in closing, said the formation of gall-stones through bacteria had been clearly demonstrated by a series of experiments. He did not believe anyone would strongly advocate operation unless the gall-stones were producing symptoms.

Ovarian Pregnancy.—Dr. J. Clarence Webster, of Chicago, reported a case of ovarian pregnancy. There was a right ovarian irregularly rounded swelling, measuring 7 by 8 cm. There was no evidence of rupture into the peritoneal cavity. The adhesions were recent. Sections of the ovarian swelling consisted mainly of extravasated blood and disseminated fragments of the chorion. No evidence of transformation of ovarian connective tissue into decidua was noted. It was certain that the pregnancy did not start in a Graafian follicle.

Dr. J. Whitridge Williams, of Baltimore, said there was no doubt that ovarian pregnancy occurred, but it was the rarest of all forms of extrauterine pregnancy. In regard to the Müllerian origin of ovarian pregnancy, he was not quite convinced of it. While there was no doubt that Müllerian tissue might be found in the ovary, as mentioned by the essayist and confirmed by numerous observers, he thought it was going too far to advance that view in explanation of every case of ovarian pregnancy.

Dr. John T. Thompson, of Portland, Me., referred to a case of ovarian pregnancy he had reported at a previous meeting of the Society. He called attention to the nature of the structures in which pregnancy occurred, and to the frequency with which rupture might occur in the early days.

Dr. Edward P. Davis, of Philadelphia, removed an ovarian pregnancy about a year ago, the histology of which had not been completely worked up as yet, although a diagnosis was made very early of the nature of the tumor from the enlarged ovary. The indications were that the pregnancy did not originate in the Graafian follicle.

Dr. Laphorne Smith, of Montreal, had diagnosed ectopic pregnancy by the clinical symptoms; had operated, and found hematoma of the ovary. He had said to his students that he was sorry that his diagnosis was wrong, because authorities maintained that there was no such thing as ovarian pregnancy, but after hearing what had been said he was convinced there was.

Uretero-lithotomy.—Dr. J. Wesley Bovée, of Washington, D. C., in a paper on this subject, gave the history of the operation, and then discussed the size and number of calculi. The routes for reaching and extracting ureteral calculi, he said, were the transperitoneal and the extraperitoneal. The latter might be subdivided into loin, inguinal, vaginal, rectal, sacral, perineal, and transvesical. The transperitoneal route should never be the one of election, as the danger of peritoneal infection from the urine was too great. Of the extraperitoneal routes, the selection would depend largely upon the location of the calculus or calculi, although the operation of Ceci of removing it through the rectum should only be considered justifiable when the stone had practically sloughed through into the rectum. In a class of cases characterized by the stone having been lodged in the intravesical portion of the duct and later sloughed into a pocket in the bladder wall, which it had made for itself, the vaginal and inguinal routes were the only safe ones, although in so stating he was not unmindful of the number of cases

in which suprapubic cystotomy had been done. He discussed the removal of the calculus from the ureter, and the methods for so doing; also the treatment of the ureteral opening. Speaking of drainage, he stated that all ureterolithotomy wounds should be drained. This was because the urine was practically never normal, therefore rendering wound infection probable. The possibility of urinary leakage subsequent to operation afforded another positive indication for drainage.

Nephrectomy for Primary Tuberculosis of the Kidney.—Dr. Hiram N. Vineberg, of New York, read a paper on this subject. Tuberculosis of the kidney, both primary and secondary, was more frequently met with in women than in men in the proportion of about two to one. It was different from what occurred in men; renal tuberculosis in women was rarely associated with tuberculosis of the genital organs. A cystitis in women that resisted the topical applications of the silver nitrate solution by the Kelly method should be looked upon with marked suspicion as being of tuberculous character, even though repeated examinations of the urine should show an absence of the tubercle bacillus. The differential diagnosis of a non-tuberculous from a tuberculous cystitis with the aid of the cystoscope was not as reliable as the therapeutic test outlined in the preceding sentence. Pronounced reddening or ulceration about the mouth of one of the ureters, with absence of other bladder changes, was held by some authorities as pathognomonic of tuberculosis of the corresponding kidney; while the sign was an important one, too much weight should not be attached to it in women. In most cases the removal of the diseased kidney would bring about practically a cure of the descending cystitis. He doubted the wisdom of the advice to cure the cystitis before undertaking the removal of the kidney. In women, owing to the fact that the disease was most frequently primary and unilateral, the modern tests for determining the functional capacity of the second kidney were not as essential as in men. Catheterization of the supposedly healthy kidney was a procedure to be avoided, when, as was frequently the case, there was associated a tuberculosis of the bladder. The prognosis of nephrectomy in renal tuberculosis in women was exceedingly good. Of the writer's four cases operated upon, seven, five, two, and one and a half years ago respectively, all were alive and in good health.

Dr. Joseph E. Janvrin, of New York, reported a case of a woman who had been ailing for two years with what was supposed to be a renal calculus. Before operating, Dr. Willy Meyer examined the woman, and agreed with him that the case was probably one of calculus in the pelvis of the kidney, with possibly calculi in the ureter. The kidney was removed, and it was found that its pelvis was infiltrated with tuberculous deposits in the very early stage. The patient made a good recovery and was well to-day.

Dr. J. Wesley Bovée said that if one read the proceedings of the late meeting of the German Congress, he would be impressed with the comparatively large proportion of cases in which primary tuberculosis was found in both kidneys, or the very small proportion in which one kidney alone was involved. As to the indications for operation on tuberculous kidney, the surgeon should be sure that the opposite kidney was capable of carrying on the function of excreting urine for the whole body before he decided to remove one tuberculous kidney. A nephrotomy might be done, and the kidney most markedly diseased drained, without taxing the other kidney to a great extent. As regards cystitis in tuberculosis of the kidney, it was a late, not an early, symptom.

Dr. Philander A. Harris, of Paterson, N. J., said that in cases of tuberculosis of the kidney it was difficult,

where the bladder was corrugated and changed by the pathology present, to find the ureter; but by painting the entire field of the bladder with some solution sufficiently colored with a swab, as Prussian blue, he had succeeded in finding the ureters in the case of a girl which he could not otherwise locate.

Dr. Seth C. Gordon operated on a man, removing a kidney which was situated low down in the abdomen, painful, and bound down by adhesions. The patient died eleven days after the operation, and post-mortem examination showed that the man had no other kidney. Two years afterward he removed a very large kidney from a woman, who lived twenty-eight days after operation. For twelve hours she did not have a single uremic symptom, nor was a drop of urine secreted, and she died in full possession of her faculties. Post-mortem examination revealed that she had no other kidney.

Dr. J. M. Baldy said it was not uncommon to have medical men in the wards of the Polyclinic ask if the ureters had been catheterized in the cases of supposed kidney disease, and not infrequently a perfectly healthy kidney was palpated and found on one side which utterly failed to secrete with the patient under an anesthetic or without it. In some instances this failure on part of the kidney to secrete was undoubtedly brought about by the influence of the anesthetic. At any rate, anesthesia would reduce the quantity of secretion very materially. He had had exactly that same experience a number of times in patients whose ureters he had catheterized, but to whom no anesthetic had been given.

Dr. George M. Edebohls said that some four or five years ago he read a paper on "The Other Kidney and Contemplated Nephrectomy." In it he advocated that before removing a kidney an incision should be made on the opposite side to determine by actual inspection and palpation, first, the presence of another kidney, and, second, its probable health, so far as could be determined macroscopically, before removing the diseased kidney. In spite of the advance made in diagnosis, and its limitations in kidney diseases, he had adhered to that rule in all nephrectomies performed since that time, and in one case he had saved a woman's life by so doing.

Dr. J. Riddle Goffe, of New York, reported a case bearing on the removal of the ureter in connection with tuberculosis of the kidney, the patient having been operated on by him in 1896. She was a woman, twenty-two years of age, who had a very large tuberculous abscess of the right kidney. He removed the kidney and three inches of the ureter. She made an excellent recovery, excepting that she had a sinus which lasted four months and then healed. Patient was now a graduate nurse and in perfect health.

Dr. Edward Reynolds, of Boston, gave his experience of 10 nephrectomies for tubercular disease, 7 of them being complete nephro-ureterectomies, all successful, so far as operative mortality was concerned.

Hypertrophies and Inflammations about the Urinary Meatus.

Dr. Robert L. Dickinson, of Brooklyn, read a paper on this subject, saying that their frequency, and the suffering caused gave them an importance out of all proportion to their minute size. Overlooked because hidden among folds of mucous membrane. They were explained by embryology. A tiny ribbon ran from the rear of the vaginal opening forward, on each side of the vaginal and urethral openings, across the vestibule to disappear beneath the clitoris. This fold was persistent in those cases where the hymen ran forward of the meatus, or the meatus seemed to open on the anterior vaginal wall. This fold was enlarged by friction or traction to produce flaps or labia, hanging out each side of the meatus. They were found only with corrugated labia. Dilated or dilatable urethra often ac-

companied them. The urethral glands opened near the apex of the flaps. They were long, running down into the anterior column of the vagina. Swelling from infection differed from hypertrophy. The cure of chronic inflammation was only feasible by obliteration of the glands. A fine probe passed to the bottom of the gland rendered the vestibular-vaginal surface tense; the cautery wire cut out the probe. For piles of the meatus, the cautery wire was used after cocaine; for prolapse or dilatation of the urethra, resection of the anterior vaginal wall or paraffin injections into the urethrovaginal septum produced a sigmoid profile.

Surgery of the Female Urethra.—Dr. Ely Van de Warker, of Syracuse, N. Y., read a paper on this subject. The urethra, he said, appeared like an insignificant part, its vital relations were negligible, its anatomy was relative, and acquired its importance from its related organs, but it might be said to epitomize a large share of the suffering that woman's pelvic organs inflicted upon her. The amount of disturbance caused by a simple irritation of the urethra to the bladder and indirectly to the kidneys afforded striking proof of the validity of reflected nervous disturbance. The term sacculation was regarded as better than the old one, urethrocele. Its major cause was mechanical, as inflammation alone was not adequate to its production. The urethra might be said to belong to the perineal rather than the pelvic zone of organs. The walls of the canal depended in a measure upon the support of the perineal body. It was often associated with long-standing rupture of this part. Restoration of the perineum was therefore essential to treatment of the sacculation. When large, an elliptical flap of the walls of the urethra was removed and the edges brought together by fine silk sutures. Prolapse of the mucous lining of the urethra the author had generally associated with long-standing urinary troubles of various kinds. It was therefore probably due to a gradually progressive condition, and was a typical ptosis, and complied with the general law of genital prolapse. After removing the prolapsed portion there was a marked tendency to recurrence unless the conditions which gave rise to it were treated and cured. Bladder incontinence and dribbling were often lifelong conditions. That this was due to a defective action of the sphincter vesicæ was more than doubtful. Dribbling was one of the symptoms of hysteria, of which a striking case was given in illustration. Narrowing, by operation, the bladder and end of the urethra, linear cauterization at this point, had afforded relief. Any treatment was liable to fail, and relapses were frequent. The powerful influence of hysterical disturbance over the urinary tract was constantly observed. Dribbling was the related phase of retention. The treatment of this form was more satisfactory. The urethral stricture, when of small caliber, was frequently found with dysuria and dribbling. The author referred to but two cases of urethral mucous polypus and concluded that they must be rare. These growths ought never to be twisted off, as the tissues were too friable. Removal of the growth through the mucous membrane, so that no stump was left, was the proper procedure. Stricture of the urethra, in the author's experience, is common in women. Any condition that tended to produce linear or annular thickening thus led to stricture. Specific urethritis might produce stricture, but it was not the frequent cause alleged by some writers. Stricture of large caliber might be located and measured by the Otis bulbs, but never by the sound, as was recommended by old systematic writers. Annular stricture of the meatus was the form most commonly met with. These ought to be incised and made to heal in an open condition by the frequent passage of the sound. Dilatation alone was

too painful and required too much time. As to eversion of the mucous membrane at the meatus, its prototype was the fusiform stricture of Otis, and its surest cure was by dilatation. Caruncle of the urethra was a common occurrence. Removal, involving the whole thickness of the mucous membrane, being careful not to leave a stump, was an effectual cure.

Pyelitis Complicating Pregnancy.—Dr. Edwin B. Cragin, of New York, said the occurrence during pregnancy of a marked rise of temperature, with pain and tenderness on the right side of the abdomen, was always a source of anxiety to the obstetrician. Although several able articles describing the condition had appeared, it was not generally recognized that pyelitis was a not infrequent cause of the above symptoms. It might be confused with appendicitis, typhoid fever, or salpingitis. It occurred almost, if not quite, invariably on the right side. It was due to pressure on the ureter by the pregnant uterus plus an infection. This infection was usually descending, and was usually due to the colon bacillus. The urine was acid, contained at first albumin and perhaps a few casts, soon followed by pus and bacteria. The prognosis was usually good. Induction of labor was seldom indicated. The medical treatment by urotropin, or allied drugs, with ice-bag over the kidney, fluid diet, and large draughts of water, was usually sufficient.

A Second Case of Puerperal Eclampsia Successfully Treated by Renal Decapsulation.—Dr. George M. Edebohl, of New York, said the first case, reported to the Society a year ago, illustrated the immediate cure by renal decapsulation of puerperal convulsions, recurring with great and increasing violence after the birth of the child, a period at which the hitherto final resource of force delivery was, of course, no longer available. In presenting the case the opinion was advanced that resort to renal decapsulation in the undelivered woman suffering from puerperal eclampsia might obviate the necessity of forced delivery. The case now reported illustrated the correctness of that opinion. Renal decapsulation was performed upon a woman pregnant near term, suffering from puerperal eclampsia, and almost complete suppression of urine. The convulsions were arrested, the flow of urine was re-established, and a threatened death from uremia was averted. Two days after all this had been accomplished labor began spontaneously, and living twins were born. One child died soon after birth. The second child and the mother were in perfect health four and a half months after the termination of pregnancy. Renal decapsulation thus became the rival of forced delivery in cases of puerperal convulsions of renal origin in the undelivered woman. In puerperal convulsions, occurring or recurring after delivery, it constituted the final resort when all other measures had failed.

(To be Continued.)

THE SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE.¹

Sixth Regular Meeting, held April 20, 1904.

The President, S. J. Meltzer, M.D., in the Chair.

Members Present.—Burton-Opitz, Calkins, Gies, Hiss, Hunt, Jackson, Lee, Levene, Lusk, Meltzer, Murlin, Norris, Park, Richards, Wadsworth, Wallace, Wilson, Yatsu.

Members Elected.—J. J. Abel, E. G. Conklin, A. R. Cushny, C. B. Davenport, W. H. Howell, L. B. Mendel,

¹ Proceedings reported by the Secretary, William J. Gies, Ph.D., of New York. The authors of the reports have furnished the abstracts. The Secretary has made only a few abbreviations and minor alterations in them.

T. H. Morgan, F. G. Novy, W. T. Porter, L. B. Stookey, W. H. Welch.

Constitutional Amendment.—The following amendment was added to the Constitution by unanimous vote: "Each non-resident member shall be required to present in person, at least once every two years, a communication containing the results of an experimental investigation, or to send to the President, within that time, such a communication for presentation at a regular meeting of the Society."

Eligibility to Membership.—Many inquiries regarding admission to membership in the Society have recently been addressed to the Secretary. It seems desirable to state publicly that only active investigators in biology or medicine are eligible to membership. The Constitution of the Society provides for automatic forfeiture of membership by any member who may cease to be an "active investigator, by experimental methods, in biology or medicine." Visitors are welcomed to the meetings.

ABSTRACTS OF THE REPORTS OF ORIGINAL RESEARCHES.

On the Secretion of Human Bile.—By P. A. Levene, W. G. Melvin and B. Michailowski. The bile was obtained from a patient with a biliary fistula. The patient had been operated upon for gall-stones, and was in comparatively good health at the time of the experiment. Attention was directed to (1) the influence of diet on the quantity of bile secreted per twenty-four hours; (2) the permeability of the biliary ducts for certain substances like methylene blue and sodium salicylate; (3) the influence of these substances and of some salts and acids on the secretion, and (4) on the nature of the so-called "bile mucin." The quantities of bile secreted under different conditions, together with other data, are briefly summarized below:

Diet and Dosage.	Volume in 24 Hours.	Total Solids.	Organic Residue.	Ash.
	Cubic Centimeter.	Per Cent.	Per Cent.	Per Cent.
Mixed diet.....	780	1.57	0.76	0.82
Animal diet.....	785	1.68	0.60	1.08
Milk diet.....	845	1.61	0.56	1.05
Vegetable diet.....	835	1.64	0.50	0.84
Sodium carbonate.....	461	1.62	0.71	0.92
Muriatic acid.....	461	1.53	1.08	0.45
Calcium chloride.....	687	1.63	0.56	1.08
Sodium salicylate.....	642	1.40	0.42	0.98
Methylene blue.....	864	1.58	0.54	1.04

For methylene blue and sodium salicylate the bile ducts proved less permeable than the kidneys. There was observed a marked increase in secretion after subcutaneous injections of methylene blue. The "mucin" was found to be a phosphorized proteid, but no purin bases could be detected in its molecule.

Experiments with Certain Nitriles and Their Antidotes.—By Reid Hunt. Experiments (carried out in the laboratory of Prof. Ehrlich) on the toxicity of a number of nitriles, and the antidotal action of certain sulphur compounds toward them, were described. Most of the nitriles studied are poisonous in virtue of the HCN which is split off in the body; in the case of some of the nitriles of the aromatic series and of certain amino nitriles, the molecules themselves seem to be poisonous. Although each of nearly all of the compounds studied is capable of splitting off one molecule of HCN, it was found that the toxicity of the various compounds differed greatly. The toxicity depends in general upon the ease with which the HCN is split off; in some cases this seems to bear a relation to the ease with which the residue united to the CN group is oxi-

dized in the body. Benzonitrile, containing the group C_6H_5 , which is oxidized with difficulty in the body, is scarcely more poisonous than phenol. Acetonitrile, also containing a group, CH_3 , which is oxidized with difficulty, is also but slightly toxic. Propionitrile and formaldehydecyanhydrin, which contain easily oxidizable groups, C_2H_5 and CH_2OH , are very poisonous. The toxicity of the molecules of a few nitriles is greater than that of HCN itself, although the latter was the only toxic agent involved. Thus, the molecule of chloralcyanhydrin, $CCl_3CH(OH)CN$ is nearly twice as toxic as that of HCN. The probable explanation of this is that the chloral residue with which the CN is in combination causes this compound to be distributed especially to the central nervous system; the HCN is thus split off in greater concentration in these important organs than is the case after the administration of a compound which is distributed more uniformly to important and unimportant organs. Through the application of this principle it may be possible to modify the distribution in the body of a remedial agent, so that the active principle may be present in especially great concentration in the organs which it is desired to affect. It was suggested that the powerful action of nitroglycerine upon the blood vessels may be explained on a similar hypothesis. The view of Hay, that the dilatation of the blood vessels caused by nitroglycerin is due to the formation in the body of nitrites from this body, has been generally accepted, although the objection has been made that it requires two hundred times more sodium nitrite than nitroglycerin to produce a given effect. This criticism may be met by the hypothesis that the glycerin residue of the nitroglycerin causes this compound to be distributed especially to the arterial walls, so that the nitrite will be formed in greatest concentration at the point where it exerts its action.

The work of Heymans and Masoin on the antagonistic action of sodium thiosulphate toward certain nitrites was extended to many new cyanogen compounds. In addition to the thiosulphate, several other compounds containing a sulphur atom which is easily split off, were tested (the sulphur unites in the body to form a little poisonous sulphocyanate); the most efficient of these new sulphur compounds were thialdin, carbothialdin and potassium xanthogenate. Great differences in the extent of the antidotal action of these bodies toward the various nitriles were noted. Thus, thialdin, protected against nitriles toward which potassium xanthogenate was without action; toward other nitriles potassium xanthogenate was the more efficacious. Many of these differences can be easily explained on the hypothesis that the various nitriles and sulphur compounds are differently distributed in the body. Unless both the sulphur compound and the nitrite reach the same cells, and unless the conditions in these cells are favorable for the formation of the sulphocyanate, no neutralization will take place.

Especially interesting are the experiments on the antidotal action of alcohol toward certain nitriles. It was found that small doses of alcohol protected an animal against three to five times the fatal dose of acetonitrile and formaldehydecyanhydrin, and that after otherwise fatal doses of these substances, the animal recovered if small doses of alcohol were given. It was suggested that the explanation for this action may be that because it is easily oxidized alcohol consumed the oxygen usually available for the oxidation of the CH_3 and CH_2OH groups of these compounds, and for the consequent liberation of the HCN. Support for this hypothesis was found in the fact that dextrose (another easily oxidizable substance) also protects against acetonitrile.

This seems to be the first case in which alcohol has been clearly shown to have an antidotal action toward a poison. It was suggested that alcohol may have an analogous action in certain pathological conditions in which physicians have long claimed a beneficial result from its use. Toward HCN itself and several other nitriles, alcohol has no antidotal action; in fact, in some cases, the toxicity of the nitrite was increased by it.

Toxicity of Certain Quinine Derivatives.—By Reid Hunt. In one of the side-chains of the quinine molecule there is, according to the commonly accepted view, a vinyl group, $-CH=CH_2$. As the toxicity of many compounds (e.g., neurine and allyl alcohol) is chiefly due to the presence of such a group, experiments were made (in Prof. Ehrlich's laboratory) to determine whether this is the case with quinine. A number of derivatives in which the vinyl union was broken by the addition of H (hydroquinine), or of O and OH (oxyhydroquinine), or of H and Cl (hydrochlorquinine), were tested as to their toxicity upon various mammals and certain infusoria. The experiments showed that the presence of the vinyl group in quinine is without special significance as far as toxicity is concerned, the first two of the new compounds being about as poisonous as quinine itself. The results of the experiments with hydrochlorquinine are of special interest; these showed that the addition of H and Cl decreases the toxicity for mammals while increasing it for infusoria. Thus the amount of hydrochlorquinine required to kill mice was two and a half times as much as that of quinine, while the former substance is distinctly more poisonous to certain infusoria than the latter. It is possible that hydrochlorquinine (or similar compounds) will be found to be more effective in the treatment of malaria than is quinine, and further work along these lines may result in the discovery of quinine derivatives which will be of value in certain diseases, caused by protozoa, in which quinine is of little value. Further experiments are in progress.

Report on the Metabolism of a Case of Diabetes Mellitus.—By A. R. Mandel and Graham Lusk. The case was a young man whose urine contained no albumin, little ammonia, only a small amount of acetone and no β -oxybutyric acid. All these symptoms are said to justify a favorable prognosis. The patient was put on three different diets for three successive periods: Diet 1. Rich cream, oatmeal, meats, eggs, butter. Diet 2. Same as 1, with 100 grams of levulose. Diet 3. Rich cream, meat and eggs. The oatmeal was used on account of the favorable results obtained by von Noorden. Diet 3 was practically a meat-fat diet. Upon this diet the polyuria decreased and the sugar fell from 8 to 4 per cent, both of which phenomena would be favorably interpreted by the clinician. But on calculating the ratio between sugar and nitrogen in the urine (after deducting the sugar fed in the cream) the relation between the two was found to be 3.65 grams of dextrose to 1 gram of nitrogen, as follows:

Date.	Dextrose.	Nitrogen.	D. N.
March 2, 1904....	82.7	23.0	3.60 : 1
March 3, 1904....	87.1	23.8	3.65 : 1
March 4, 1904....	100.7	27.5	3.66 : 1

It will be noticed that the sugar and nitrogen rise and fall together. The amount of fat fed varied but did not affect the ratio. The sugar production is therefore parallel to the proteid metabolism. Since 1 gram of urinary nitrogen represents the destruction of 6.25

grams of proteid we can calculate the sugar production from proteid. This D:N ratio is the same as that obtained in our laboratory in phlorrhizinized dogs. It has also been obtained by others in the human subject, but has been falsely interpreted as indicating the production of sugar from fat. It represents the maximum output of sugar from proteid and a complete intolerance for carbohydrates. It is probably the most grievous prognostic sign in diabetes.

A calculation shows that the carbohydrates in the oatmeal and levulose were nearly quantitatively eliminated in the urine when the patient was under the influence of diets 1 and 2. The patient rapidly lost in weight and died in coma five weeks after the completion of the above investigation.

Antihemolytic Properties of the Serum of Nephrectomized Rabbits.—By S. J. Meltzer and William Salant. In studying the properties of the blood of nephrectomized rabbits it was found that bullock's serum, which is distinctly hemolytic for normal rabbit's blood, was less so for the red cells of nephrectomized rabbits. It was found further that the serum of nephrectomized rabbits contains a distinct antihemolytic element which is destroyed by heating for an hour at 58° C. On the other hand, the "washed" red cells of nephrectomized rabbits' blood are at least no more resistant to the hemolytic influence of bullock's serum than the red cells of normal rabbit's blood.

On the Influence of Suprarenal Extract upon Absorption and Elimination, with Demonstration.—By S. J. Meltzer and John Auer. In a series of experiments it was found that a previous intravenous injection of adrenalin will make a rabbit resistant to a surely fatal dose of strychnine. (Such an experiment was demonstrated before the society.) In experiments with subcutaneous injections of fluorescein it was also found that in the animal which had previously received injections of adrenalin, the greenish yellow color of the conjunctiva, mucous membranes and skin appeared much later than in the control animal. Both results might be due to delayed absorption or delayed transudation, or to both. In further studies with subcutaneous injections of fluorescein it was found that the color entered the blood later and in diminished quantity in the adrenalin animal than in the control. Among other observations it was noted that the kidneys of the control animal were colored more intensely than those of the adrenalin animal. The same difference was found when equal quantities of the stain were injected directly into the blood-stream. The lesser coloration of the kidney is therefore due to the diminished elimination by the kidneys in the adrenalin animal. Other related problems are still under consideration. But the reported series of experiments already justify the conclusion that suprarenal extract delays absorption as well as elimination. The starting point for the investigation was the hypothesis, stated by Dr. Meltzer in another publication, that since capillary endothelia possess irritability and contractility their pores are surrounded by rings of contractile protoplasm which act like sphincters upon them, thus increasing and decreasing the permeability of the endothelia. The explanation for the observed facts is now offered that suprarenal extract, which causes a contraction of the smooth muscle fibers of the arterioles, causes also an increase of the contractility of the endothelia, diminishing thereby their permeability and thus reducing their powers of absorption and elimination.

Review—Mendel's law.—By E. B. Wilson. A review of the more important facts in Mendel's observations, together with a statement of some of the deductions to be drawn from them.

SOCIETY OF THE ALUMNI OF THE CITY HOSPITAL.

114th Stated Meeting, held April 13, 1904.

Three Interesting Surgical Cases.—Dr. J. B. Bissell presented three very interesting surgical cases. The first was that of a man who presented a peculiar tumor about the size of a child's head at the right side of the neck. The second case was that of a man about fifty-five years of age who twenty years ago had been operated on for empyema. In succeeding years he had been reoperated, among others by Dr. Weir. The third case was that of a man, an engineer by trade, who presented an obscure new growth on the costal aspect of the body; right side.

Unilateral Right-sided Goiter.—The consensus of opinion was to the effect that the first case was a cystic unilateral right-sided goiter, in spite of the fact that the man stated most emphatically that it had appeared very soon after he had been almost choked while swallowing a piece of meat. It was further agreed that the case of empyema, which Dr. Bissell stated had twenty years ago undergone Eastlander's operation for removal of the ribs for the obliteration of the empyema cavity, was a most remarkable one. True, the sinus had never completely healed, but the man's life had been preserved. The opening had been made in the left anterior portion of the chest midway between the axillary and mammary lines. The heart could be seen beating vigorously against the exposed and much-thickened pericardium, and the sounds transmitted through a stethoscope, the bell of which was placed over this area, were remarkable and instructive. As to the new growths on the ribs of case three, it was uniformly agreed that they must be sarcoma, although it was noted that singularly enough the glands on the left side of the neck were involved, while those on the right side had almost entirely escaped enlargement.

Empyema.—Dr. Guiteras, in discussing the second case, said that the ever-present problem before the operating surgeon was, to wash or not to wash the pleural cavity. Personally he had always washed out the cavity and that immediately after operation; and had never yet experienced any difficulty from so doing. He employs a double catheter and almost any irrigating fluid of a mild degree of strength. Peroxide is safe to use and has a remarkable faculty for dislodging coagulæ.

Dr. G. C. Weiss considered that Dr. Bissell had done the society a great favor in exhibiting this very remarkable case of empyema. It seemed to him in a very broad way to open up the question of whether or not we should resect a rib or endeavor to drain these cases intercostally.

Dr. J. B. Bissell stated that he considered very free drainage absolutely essential. He spoke very favorably of Dr. Bryant's vacuum catheter and of James' bottles. They work on the principle that if you can't pull you may push. He considered that the question in the treatment of these cases was not so much a matter of when to wash or what to wash with as it was how to establish perfect drainage. This case of empyema in his opinion showed that drainage had not been complete, because the fistula had persisted for upward of twenty years.

Dr. A. Moore agreed as to the necessity of free drainage. He exhibited a small instrument which he has had made with the intent of inserting it in the wound which he makes without resecting any bone in order to hold the parts from coaptation and collapse. He said it resembled a Mild's retractor; it is so small that it can easily be buried beneath the

dressings and causes no pain when left *in situ*. In children particularly, if this instrument is put in position and separated with considerable vigor, a very free and adequate opening can be obtained.

Dr. Bissell expressed the belief that adequate drainage could not be obtained by the use of any instrument without resection of a rib or indeed in many cases resection of several ribs. This, the Schede method, is not as satisfactory as the Eastlander, in point of thoroughness. Bryant's tube is an ingenious device which is connected by means of a large piece of adhesive plaster to the wound, the connection being airtight. A Davidson's syringe bulb is passed from here into the pocket of the patient while in another pocket is housed a good-sized flat bottle. Throughout the day, as the patient thinks of it, he pumps this bulb and creates a vacuum in the bottle which is transmitted to the pleural cavity. This device is found in the hands of Dr. Bissell to work admirably.

Miliary Tuberculosis Following Appendectomy.—

Dr. J. G. Wells reported a case of this affection in a girl of sixteen. Prior to the attack of appendicitis, which was of the usual acute type, the child was perfectly healthy so far as a very intelligent history could show. At the time of operation, however, she was found to have in addition to her appendicitis a dry form of miliary tuberculosis, the intestines being closely matted together. After some deliberation, the operator broke the adhesions holding these together, sponged the parts freely and sewed up the wound. The immediate recovery of this case was uneventful. In six weeks the abdomen was found to be soft, all rigidity having entirely disappeared, but the patient had a temperature of 102° to 104° F. Three months later, it became evident that she was a victim of general miliary tuberculosis.

Dr. Wells reported a second case. The patient was a child, five years old, a girl in whom a sudden temperature of 105.5° F. had developed. This was followed by sweat and subnormal temperature. It presented all the characteristics of a typical malarial invasion. The blood was, however, free from plasmodia. Leucocytosis, nevertheless, was marked. The skin was yellow. There was tenderness over the hepatic region. Fitz, of Boston, saw her and diagnosed cholangitis. Nothing further was done. Two weeks later she became very sick, and it then was wondered whether or not she had developed a hepatic abscess. Even in the early part of general anesthesia, the right rectus was found to be very rigid. The liver was found to be hard and blue. The gall-bladder was difficult to locate, it being on the posterior wall of the body cavity. Its distention was such that it had reached the size of a large sausage. A tumblerful of thick, creamy fluid was evacuated from it and permanent drainage established. The liver, which had been greatly enlarged, could be seen, under the eye of the operator, to shrink visibly, and within a few moments it had assumed almost normal proportions. There were many interesting pathological problems in connection with this condition.

Dr. T. F. Riley said that this interesting case of miliary tuberculosis added one additional page in the long history of proofs that tuberculosis anywhere in the body, except under unusual conditions, should be severely let alone. One of the most classic positions from which general tuberculosis is known to be induced by operative intervention is in the case of fistula in ano.

Dr. J. B. Bissell had the good fortune to operate on a great many cases of tuberculous peritonitis and

had obtained gratifying results, but he makes it a point never to interfere with the adhesions.

Dr. G. C. Weiss reported in most interesting detail the case of a child in whom he had done an ordinary appendectomy. For a number of days after the operation the patient seemed to be doing well, but suddenly she began to have a little temperature and almost before her attendants realized it, had developed a serious case of empyema. This was finally located by aspiration and drained by resection of a portion of the eighth rib. Secondary empyemata are rare, except from pneumonic and other infections of the lungs, but from the abdominal viscera one does not ordinarily expect such a complication. It was noteworthy that in this case the temperature went down to normal, forty-eight hours before the operation.

Dr. E. M. Sill said that in his experience this was not uncommon in the empyemas of children. He reported a case of catarrhal empyema in which the tumor was located directly in the median line.

Dr. A. Rupp, in the absence of Dr. Morris Manges, who was to have contributed some "Practical Points of Medical Diagnosis," read a short paper entitled "Paradoxical Measles."

BOOK REVIEW.

PROGRESSIVE MEDICINE: December, 1903, March, 1904. Lea Brothers & Company, New York and Philadelphia.

VOLUME IV for 1903 discusses Diseases of the Digestive Tract and allied Organs, by J. C. Hemmeter; Anesthetics, Fractures and Dislocations, by Dr. L. C. Bloodgood; Genito-urinary Diseases, by Dr. W. T. Belfield; Diseases of the Kidneys, by John Rose Bradford; Physiology, by Dr. Albert P. Brubaker; Hygiene, by Charles Harrington, and Practical Therapeutics, by Dr. H. R. M. Landis. The scope and intention of this work does not need any further characterization, in this place. Practically everything that is of value along these lines is to be found in this excellent quarterly year-book. That which renders it valuable above other works of similar aim, is that more than any other, in our opinion, it shows the results of greater care devoted to making a continued story from a large number of abstracts. In some cases the authors have not been able to free themselves altogether from the purely abstract method, but in most cases the general trend of investigation is related, rather than short clippings of isolated experiences.

With the opening of the present year Progressive Medicine has undergone a certain amount of modification. The publishers have reduced the price, and are supplying it to the profession in a paper cover. This reduction in price brings the work within the reach of everybody. In the first volume for 1904 Dr. Charles H. Frazier gives a very full digest of the recent work which has been done in Surgery of the Head, Neck and Thorax, a very complete analysis of the work in Facial Palsy being presented. Dr. Robert P. Preble writes concerning the work lately done in Infectious Diseases, leaving very few aspects of the subject untouched upon. Dr. Floyd Crandall takes up the Diseases of Childhood, and Dr. C. P. Grayson abstracts the literature of Laryngology and Rhinology, and Dr. Robert Randolph that of Otology.

In its new form the same care and attention to typography are followed as in the old series, the only modification being that of price.